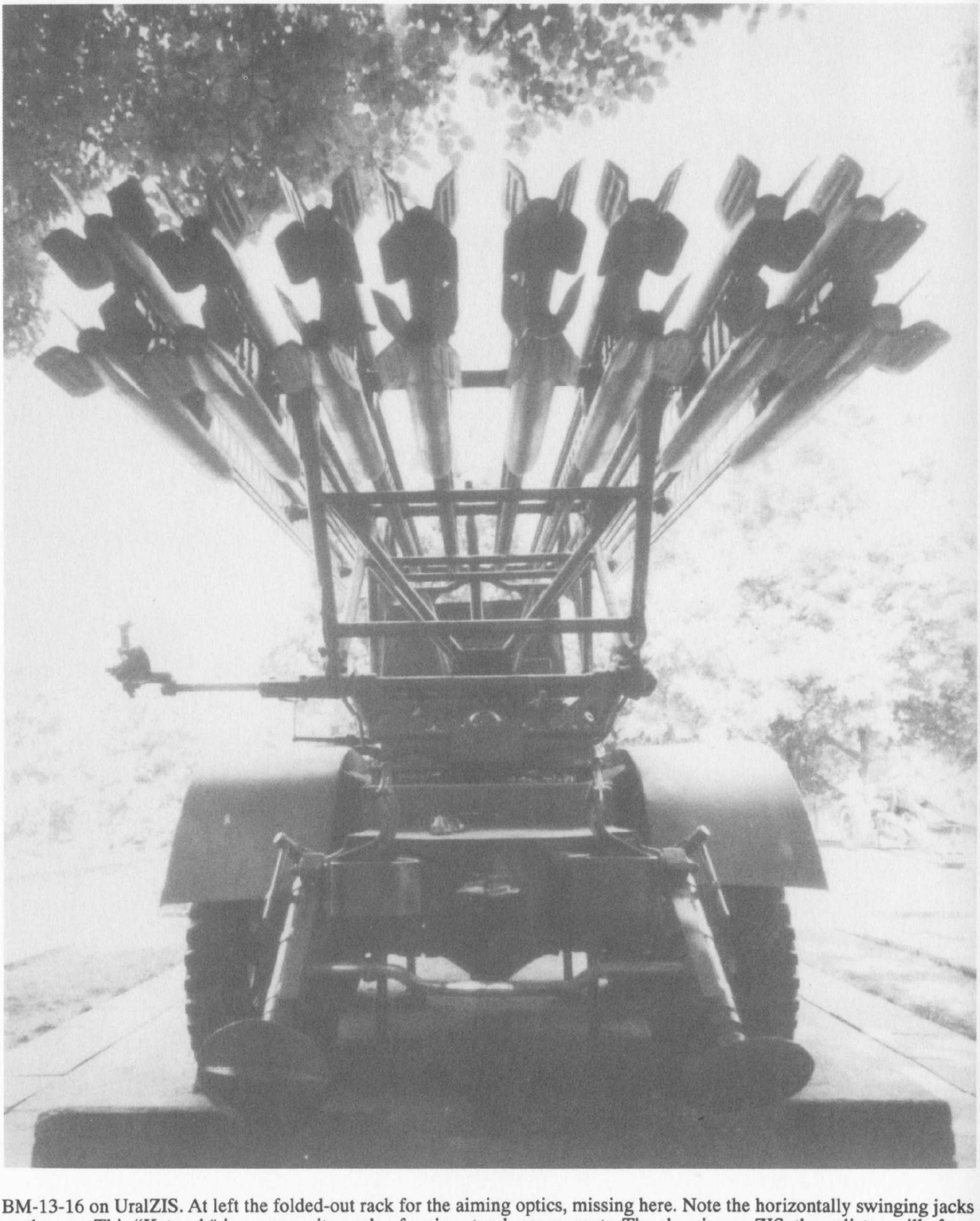
STALIN ORGANS

RUSSIAN ROCKET LAUNCHERS

MICHAEL FOEDROWITZ

Schiffer Military/Aviation History



BM-13-16 on UralZIS. At left the folded-out rack for the aiming optics, missing here. Note the horizontally swinging jacks on the rear. This "Katyushä is a composite made of various truck components. The chassis as a ZIS, the radiator grille from UralZIS. The ZIS chassis made in the Ural area differed in having a wooden cab.

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RUSSIAN ROCKET LAUNCHERS

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Eastern front, southern sector, presumably 1943. Two batteries of BM-13-16 on Studebaker chassis firing a salvo (WAF)

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FOREWORD

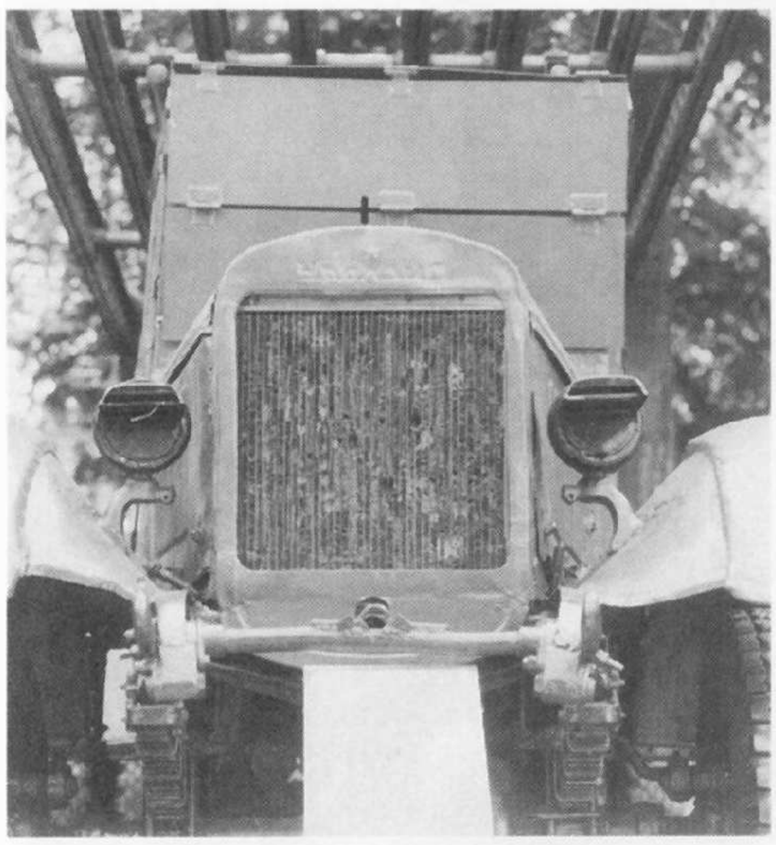
"We all love our sweetheart Katyusha,
We like to hear it when she sings.
It blasts the enemy's soul out,
And gives courage to her friends."

(Russian soldier song)

"Whoever has been under fire from a 'Stalin Organ' will never forget it. It was hell."

(German engineer officer, southern sector, eastern front)

One of the most famous weapons of World War II was the "Katyusha" (Katie) used by the Red Army, respectfully named "Stalin Organ" by the German soldiers. This weapon was a multiple rocket launcher, which was generally mounted on a truck chassis and is still in service, in more advanced form, with the troops of many of the world's armies. In its massed concentration, the "Katyusha" was supposed to provide destructive artillery fire in large-scale attacks, in order to make large-scale breakthrough operations possible. This took place in the course of World War II: at Stalingrad in November of 1942, Orel in July of 1943, where the 11th Guard Army fired 400 salvos at their breakthrough point, in Operation "Bagratian" in the central sector on June 22, 1944, on the Oder on April 16, 1945. In the storming of Berlin, the 1st White Russian Front had 1000 "Katyushas", which could fire 18,000 rockets in one salvo, at their disposal. They were lovingly called "Maria Ivanova" by the Russian soldiers.



BM-13-16 on UralZIS chassis.

Translated from the German by Dr. Edward Force,
Central Connecticut State University.

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Printed in the United States of America
ISBN: 0-88740-669-6

This title was originally published under the title, *Die Stalinorgel; Sowjetische Mehrfachraketenwerfer,*
by Podzun-Pallas Verlag.

We are interested in hearing from authors with book ideas on related topics.

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Thanks also to Mr. Seneral a.D., Horst Scheibert, Prof. Dr. Manfred Mohrdieck (Berlin), Roman Matuszewski (Warsaw), Izabela and Alice Foedrowitz (Hannover), Michael Jerchel (Hannover), Andrei Sher (Moscow), Darek Muszer (Hannover), Christoph Lipowicz (Berlin), Maciej Lagiewski (Breslau), Engbertus Backer (Leer).

COVER PHOTO

A combination of the "Stalin Organ": a ZIL 131 of postwar days with a launching frame (BM-13-16) with the serial number 281 35 87 of the former armed forces of Czechoslovakia, now a display piece at the military Museum in Prague, shown at the Prag-Kbely Airport.

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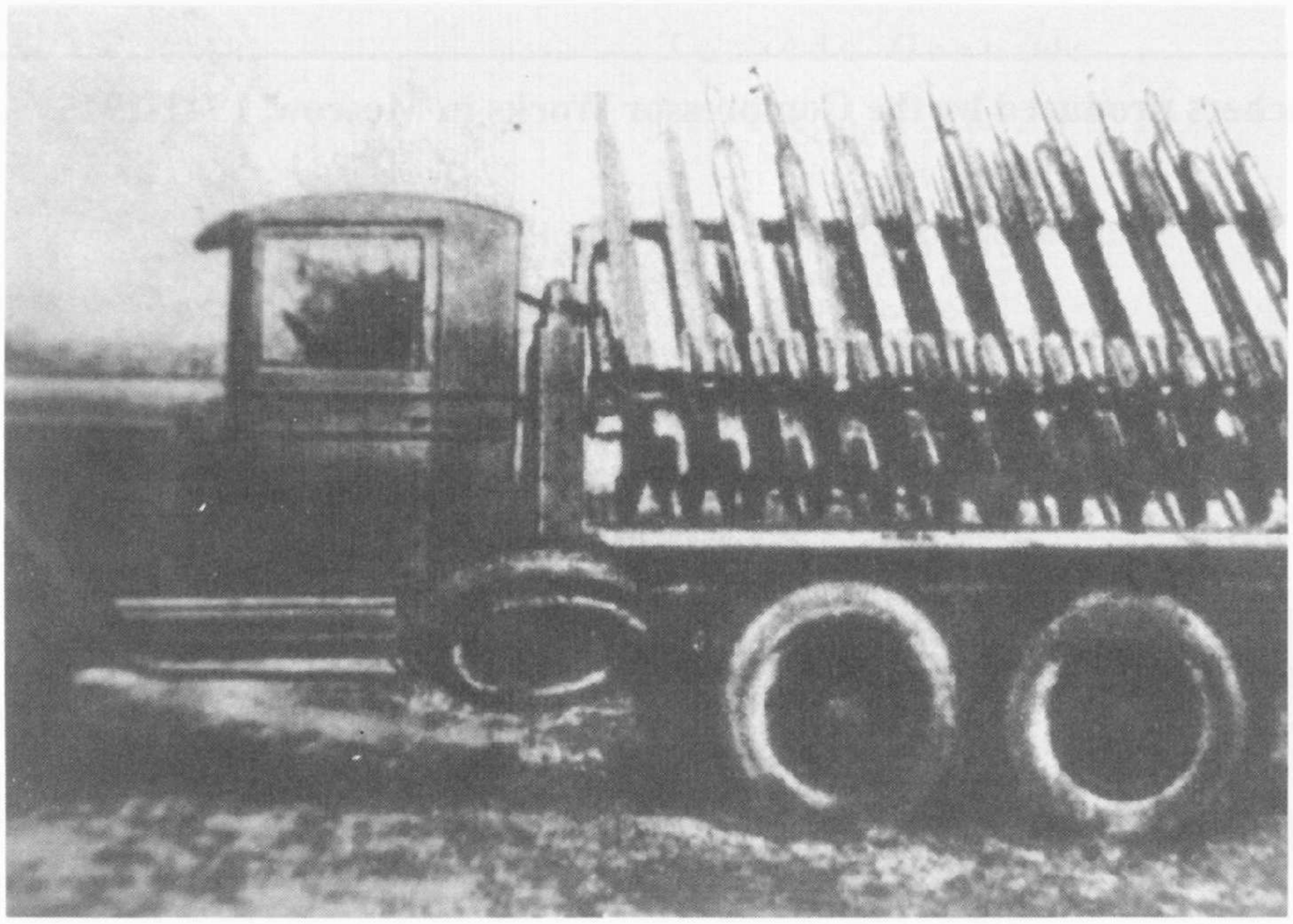
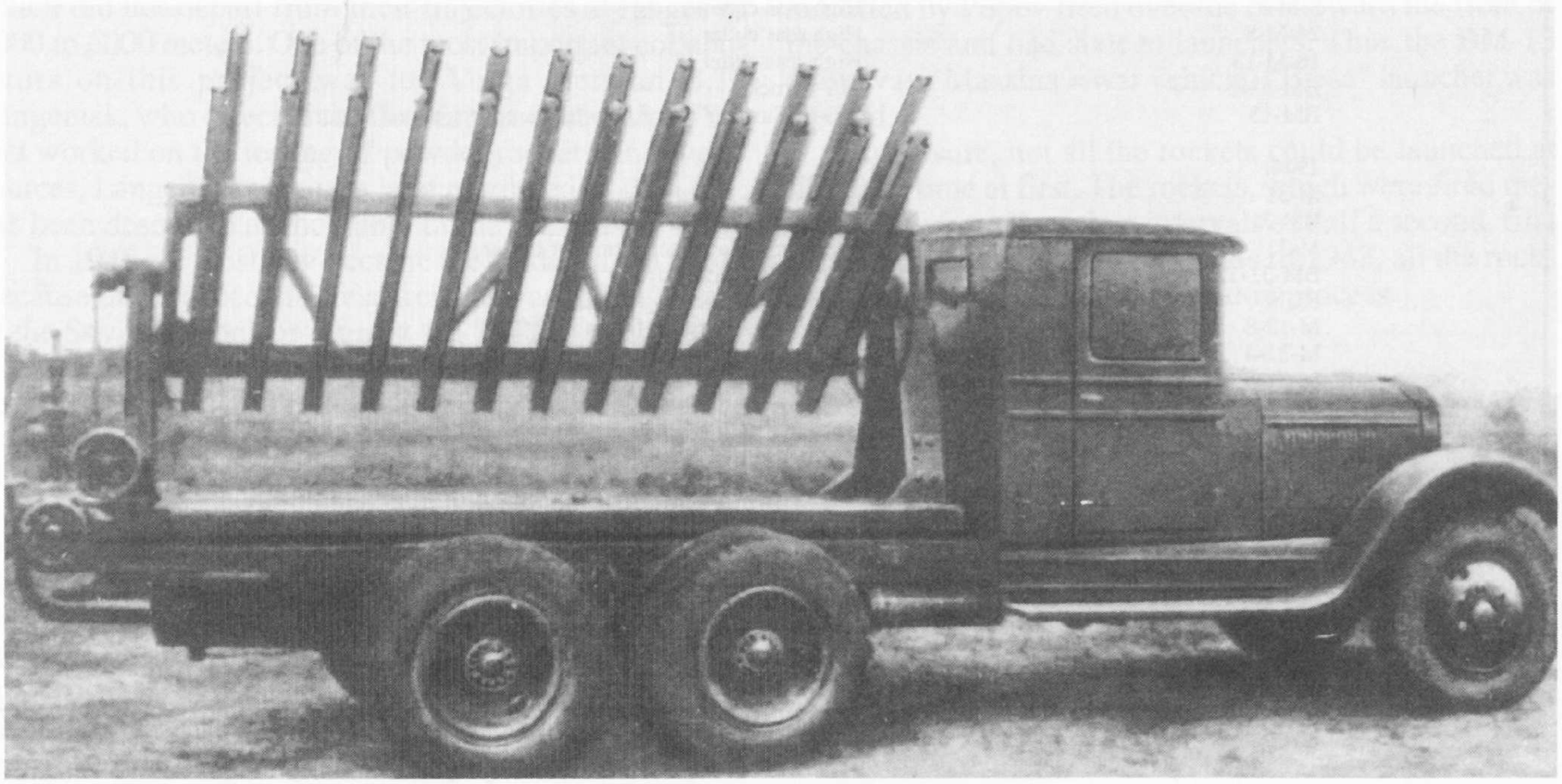


One of the first Stalin Organs, built in 1938, on a ZIS-6 chassis. Note the launching frames set at a right angle to the forward direction of the vehicle.

DEVELOPMENT AND PRODUCTION OF THE MULTIPLE ROCKET LAUNCHER

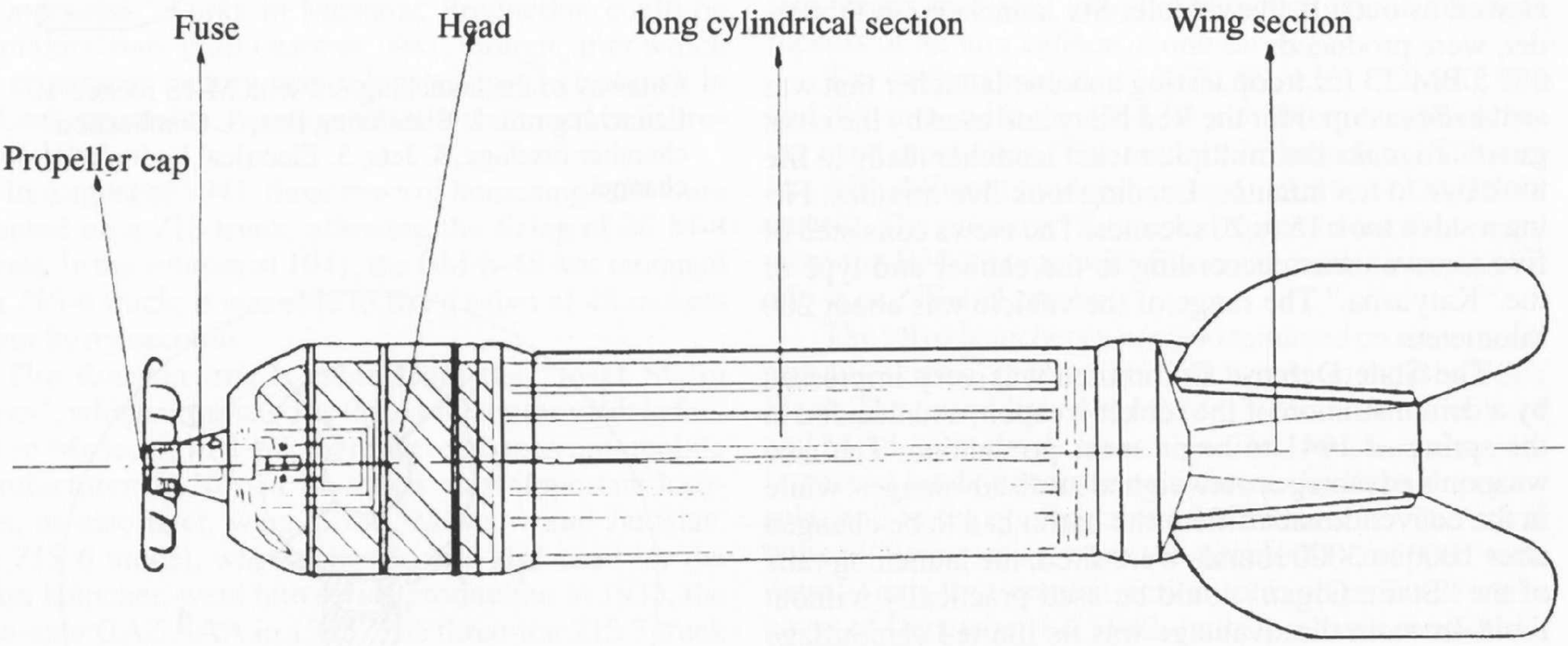
In 1919, means were made available for the "Gas-Dynamic Laboratory" (GDL) to investigate the revolutionary theories of the Engineer Nikolai Ivanovich Tichomirov, who sought to develop a missile that was simultaneously missile and launcher. The GDL was developed into the first research institute for rocket technology in the Soviet Union, concentrating its energy on the development of a solid-fuel rocket. In 1920 Tichomirov met with W.A. Artemiev, who had already carried out his first experiments with flare rockets at the fortress of Brest-Litovsk in 1908 and had been delegated to the GDL by the high command of the artillery. In 1925 the GDL moved to Leningrad, and a year later the first series of experiments with experimental powder missiles (using PTP) were concluded successfully. On March 3, 1928, the first rocket launch with smokeless powder was carried out. The projectile flew some 1300 meters. After Tichomirov's death in April of 1930, Petropavlovski became the director of the institute. Several artillery officers were sent from the "Feliks Dzierzynski" Academy to the GDL. Marshal Tuchachevski, who had understood the value of these developments, separated the GDL from the research institute of the artillery. At the end of 1932, I.T. Klemenov became its new director.



Side view of the three-axle ZIS-6 with armored door windows (MH<D).

Multiple Rocket Launchers produced by the Compressor Works in Moscow, 1941-1945

1941 (since 6/13):	
M-13	ZIS-6 truck
BM-8-36	ZIS-6 truck ("Flute")
BM-8-36	ZIS-5 truck ("Flute")
BM-8	(on trailer, "Flute")
BM-13	T-40 tank
BM-13	STZ-5 Stalinez tractor
BM-8	T-40 tank ("Flute")
BM-8-24	T-40 tank, also on T-60 ("Balkä)
BM-13	on sled
BM-8	on sled
BM-13-16	on railcar
BM-8-48	on railcar
BM-8-72	on skis
1942:	
BM-8	Balkä trailer
BM-13-16	Ford "Marmon" truck
BM-13-16	Studebaker truck
M-8-M	River cutter
M-13-MI	River cutter
M-13-MP	River cutter
BM-8-48	Ford Marmon truck
BM-13-16	International truck
MP-10	Antitank rocket launcher
BM-13-16	Austin truck
BM-13-16	Dodge truck
BM-13-16	Canadian Ford truck
M-8-M	River cutter
BM-13-16	International truck (lengthened chassis)
BM-13-16	Chevrolet truck
M-31	Four-shot launcher
M-13-M	River monitor
M-31	4-shot launcher on ZIS-5, ZIS-6 trailers
BM-13-16	Chevrolet truck (4-meter launchers)
BM-13-16	Chevrolet truck (2.4-meter launchers)
BM-13-16	XIS-6 truck
BM-13-16	GMC truck
1943:	
BM-13 N	Modernized Studebaker truck
BM-8-40	Anti-aircraft rockets on trailer
BM-13-16	Chevrolet truck (2.4-meter launchers)
BM-8-40	GAZ-AA truck
BM-13-16	Chevrolet truck
BM-13 N	Modernized ZIS-6 truck
BM-13-16	GMC truck
BM-8-36	Chevrolet truck
	Tests with captured German fog-launcher shells
8-M-8	High seas cutter
24-M-8	High seas cutter
16-M-13	High seas cutter
BM-8-48	ZIS-6 truck
BM-13	ZIS-6 "Stormer" truck, shorter launchers, added armor
1944:	
M-31	Eight-barrel launcher frame
BM-31	Studebaker truck
M-31	Eight-barrel launcher frame for trailer
BM-31-12	Studebaker "Sotki" truck
RUM	Torpedo cutter for fog mines
M-13-8	Eight-barrel launcher frame for M-13
M-31-4	Four-barrel launcher frame for M-31
M-31-6	Six-barrel launcher frame for M-31
RUM 20-4	Four-barrel launcher frame
M-8-8	Ramp for M-8
BM-8 SN	Studebaker truck (test launcher, spiral rails)
BM-13 SN	Studebaker truck (see above)
1945:	
BM-13 SN	Studebaker truck (series production)
BM-8 SN	Studebaker truck (test series)
M-31	One-barrel launcher frame for street fighting
M-13	Two-barrel launcher for street fighting



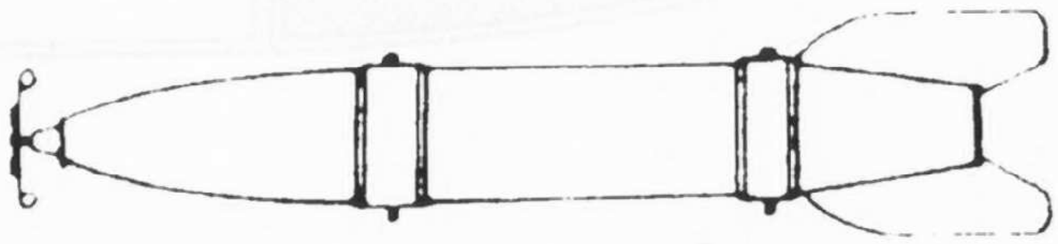
Side view of an RS-132 missile, based on captured rocket ammunition. The fast that the rocket had a propeller in front of the fuse resulted in its incorrect designation as a "flying torpedo." Rockets of this type were already used often by July 1941, but were regarded as aircraft bombs. This was correct insofar as they were fired from aircraft.

The most urgent problem was the stabilizing of the projectile, whose targeting accuracy was very imprecise and showed much scattering. In mid-1933, after numerous experiments had failed, Artemiev suggested stabilizing the 82 mm and 132 mm reactive missiles with guiding apparatus. The first success, and the confirmation of Artemiev's innovation, came in firing tests of the RS-82 (RS = Rakietnyi Snariad = rocket missile) and RS-132, which did not depart from their trajectories at ranges of 5000 to 6000 meters. One of the most important collaborators on this project was the Volga German G.E. Langemak, who directed the first department of the GDL that worked on the testing of powder rockets. In several sources, Langemak, who was later murdered by the GPU, has been described as the father of the "Katyusha."

In 1935, A. Kostikov became the leader of the GDL. Because of his successful research, he was named "Hero of the Soviet Union" on August 18, 1941.

Attempts were made to overcome the poor targeting accuracy of the RS-82 and RS-132 by researching the possibility of salvo fire. Launching rails for the projectiles, which had already been tested under the wings of aircraft, were mounted on the ZIS-5 truck chassis in October 1938. Thus the first self-propelled launcher for twenty-four 132 mm rockets came into being. The launching ramps were mounted at a right angle to the front of the chassis, and thus did not fire over the cab. This had numerous disadvantages: considerable instability during firing, damage to the vehicle and launching apparatus by the 1100-1200 degree gases during ignition of the rockets, unpleasant heat buildup, and the possibility of firing only in the already noted right-angle position. In order to deal with these disadvantages, another model was mounted on a three-axle ZIS-6 truck. The same number of launching rails was attached to a special frame in a checkerboard pattern. The launching frame had some traverse, and its elevation could be adjusted between 15 and 45 degrees. In April 1939, the designers from the Rocket Institute of Moscow, Popov and Galkovski, developed two self-propelled rocket launchers. The model modified by Popov fired over the cab toward the front of the chassis and had sixteen launchers. Thus the BM-13 (Boyovaya Maszina = war vehicle) "Eresa" launcher was created.

To be sure, not all the rockets could be launched at the same time at first. The rockets, which were fired mechanically from the cab at intervals of half a second, first had to be primed for launching. As of 1943, all the rockets were launched with one ignition process.



RS-132

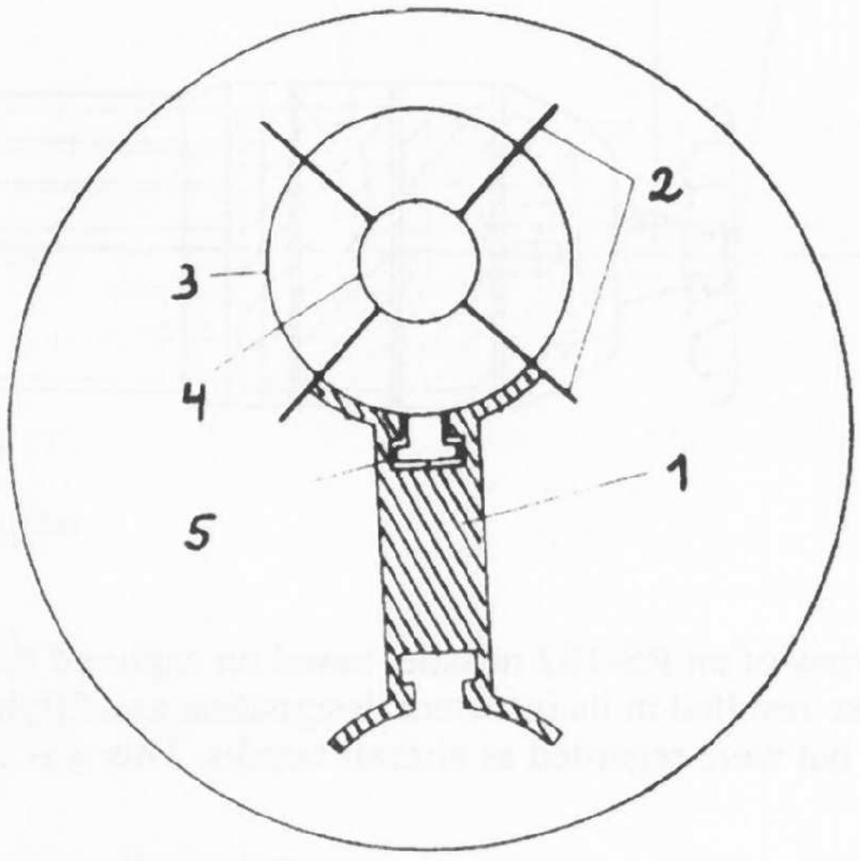
In September 1939 the "Eresa" was released for combat testing. The rockets were ignited electrically by special pyro-cartridges. Both single and salvo fire were possible. The ignition could be controlled from the truck cab as well as outside the vehicle. Six launchers, in this order, were produced:

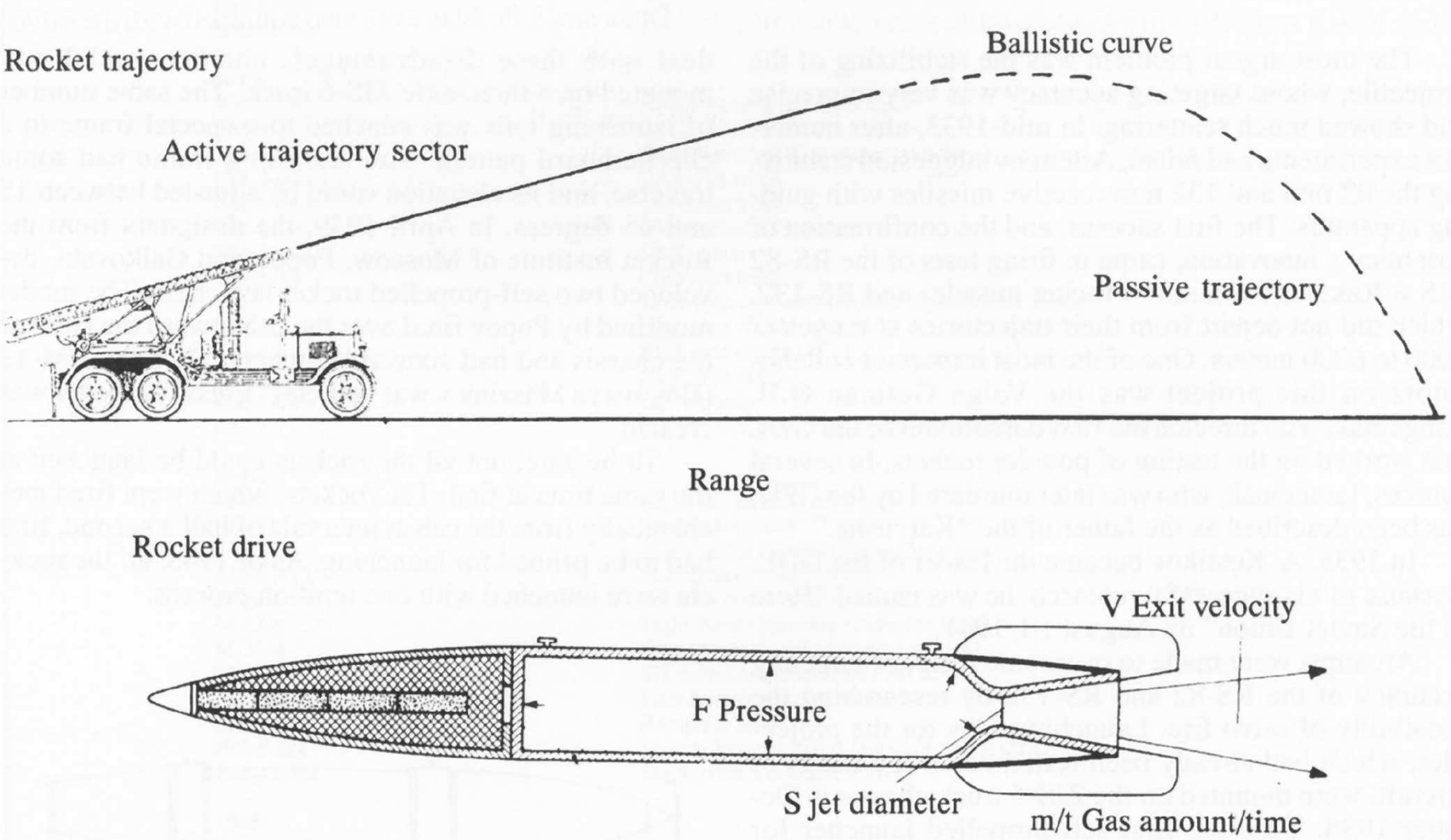
5 BM-13 for troop testing and one launcher that was sent to Sevastopol for the Red Navy and used by the coast guard. To make the multiple rocket launcher ready to fire took five to ten minutes. Loading took five minutes. Firing a salvo took 15 to 20 seconds. The crews consisted of five to seven men, according to the caliber and type of the "Katyusha." The range of the vehicle was about 200 kilometers.

The State Defense Committee was very impressed by a demonstration of the rocket weapon, and decided in the spring of 1941 to begin mass production. The new weapon's advantages outweighed its disadvantages: while in the conventional artillery the barrel had to be changed after 1000 to 3000 rounds were fired, the launching rails of the "Stalin Organ" could be used practically without limit. Its main disadvantage was its limited camouflage possibility, for a firing position could be spotted at once from the rockets' fiery tails.

M-13

Cutaway of the launching rail with M-13 rocket: 1. Launching rail, 2. Stabilizing fins, 3. Combustion chamber fuselage, 4. Jets, 5. Electrical ignition channel.





At the time of the German attack on the Soviet Union on June 22, 1941, seven firing facilities and 3000 projectiles were located in Moscow. On the same day, series production of the BM-13 salvo launcher began in the "Kompressor" works in Moscow. Production could be maintained only until October 1941, though, after which this armament factory was relocated to Chelyabinsk in the Ural mountains, where production resumed in February of 1942.

In August of 1941, three rows of launching rails were mounted on a ZIS truck, allowing the firing of 36 M-8 rockets. In the autumn of 1941, the BM-8-48 was mounted on a ZIS-6 truck; it was able to fire a salvo of 48 rockets within thirty seconds.

The Russian trucks came from the "Josef Stalin Works", which originated as the AMO motor vehicle factory in Moscow. In 1916 there were sixteen automobile manufacturers in Russia, and their most important locations, as also later, were Gorki, Moscow and Jaroslav. The ZIS 6 model, whose chassis was also used for the rocket launcher, went into series production in 1933, the three-axle GAZ AAA in 1935. The three-ton ZIS 5 truck was produced since the mid-thirties, the 1.5-ton, two-axle GAZ AA likewise. Both truck types were produced to supply the Red Army. The ZIS 5, also used in the war under the name of Miass, could run problem-free on various types of gasoline, and a crank guaranteed that the motor would start even in very cold weather.

Branch factories came into being, and they likewise were moved to the Urals at the end of 1941 because of the German threat to Moscow. Thus a truck factory, at which ZIS-5 and ZIS-6 trucks were built, was opened in Ulyanovsk. The "Ural-ZIS" was made in a version with a wooden cab, which was later covered with sheet metal in some models. For most of the three-axle ZIS trucks, the second axle was the drive axle; in others, as well as some "Katyusha" modifications, it was the third axle. In the first days of the German-Russian war, more than 200 factories produced the "Katyusha," but a considerable shortage in truck production soon became obvious. The shortages could only be met through the "Lend-Lease" agreement. From June 22, 1941 to September 20, 1945, the western Allies authorized 427,284 trucks, 409,526 of which reached Russian ports via sea routes. In 1941 the Red Army had 272,600 trucks, in 1945 664,500. As a result, the salvo launcher was mounted almost exclusively on American Studebaker and GMC trucks.

Between 1941 and 1942, three different rocket launchers were introduced into service with the troops: the 36-launcher 8 cm rocket launcher, built on the ZIS-6, the best-known sixteen-launcher M-13 type (on ZIS-6, T-70 and T-60), and the sixteen-launcher 30 cm M-31 type, mounted on the GAZ AA truck chassis.

In 1942 a new type of "Katyusha," the M-30 version, appeared. The M-8 was mounted on the GAZ 67 chassis as well as the BM-31-12 (produced as of the second quarter of 1944). The Studebaker truck was fitted with the launchers for twelve rockets of M-30, M-31 or M-31 UK calibers, the last an improved version in terms of targeting accuracy.

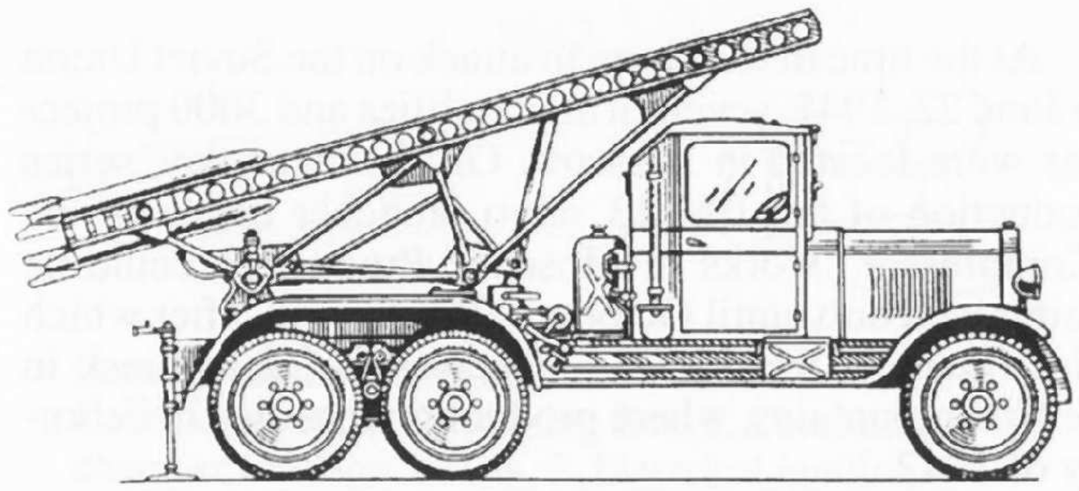
The rocket launcher was first installed on the ZIS chassis, but was also used on other vehicles: the T-60 BM-8-48 (the first number indicates the caliber, the second the number of rockets per salvo) armored trains, railcars, tractors (such as the STZ-5), sleds, on small mounts similar to the German fog launchers. The rockets could also be loaded on and fired from either single or multiple launchers. As of 1943, a rocket launcher for the mountain troops was also introduced, which could fire eight rockets of 82 mm caliber in one salvo.

The calibers included 60, 70, 80, 130, 132, 140, 280 and 300 mm, with the 80, 132 and 300 mm calibers being used most often. The number of launching rails varied, with different models having 4, 12, 16, 24, 30, 36, 48 and 60. The primary "Katyusha" types in the Red Army were the BM-13 type with five-meter rails, mounted on ZIS-6 or ZIS-151 trucks.

The salvo launchers were also mounted on river monitors and ships of the Soviet Navy for use in the Black Sea Fleet. They used the M-8-M, M-13-M and later M-8-24 and M-13-16 multiple launchers. The launchers also saw service in land operations on Crimea, the Kertsch peninsula, and in the combat around Novorossisk. The naval units at Novorossisk were the first to be equipped with them. Their first combat action took place in the early hours of December 12, 1942. In the predawn semi-darkness, four rocket boats operating southwest of Novorossisk fired twenty salvos. On February 4, 1943, the fishing schooner "Skrumbiya," which could fire 96 rockets in one salvo, covered the landing south of the city limits or Novorossisk. Torpedo boats of the Black Sea Fleet were also equipped with the "Katyushä later. According to Soviet sources, a German S-boat is said to have been sunk by Katyusha rockets south of Novorossisk in March of 1943.

Other small flotillas were also equipped with the salvo launcher, including those on rivers and seas. The "Onega Flotilla" and the "Azov Flotilla" were supplied with salvo launchers. In the autumn of 1945, the "Katyusha" was also introduced in the Pacific Fleet. The "Amur Flotilla" used its rocket launchers against the bands of the Japanese Kwantung Army and thus supported the attacking operations of the 2nd Far East Front in Manchuria.

Captain Ivan Flerov



BM-13-16

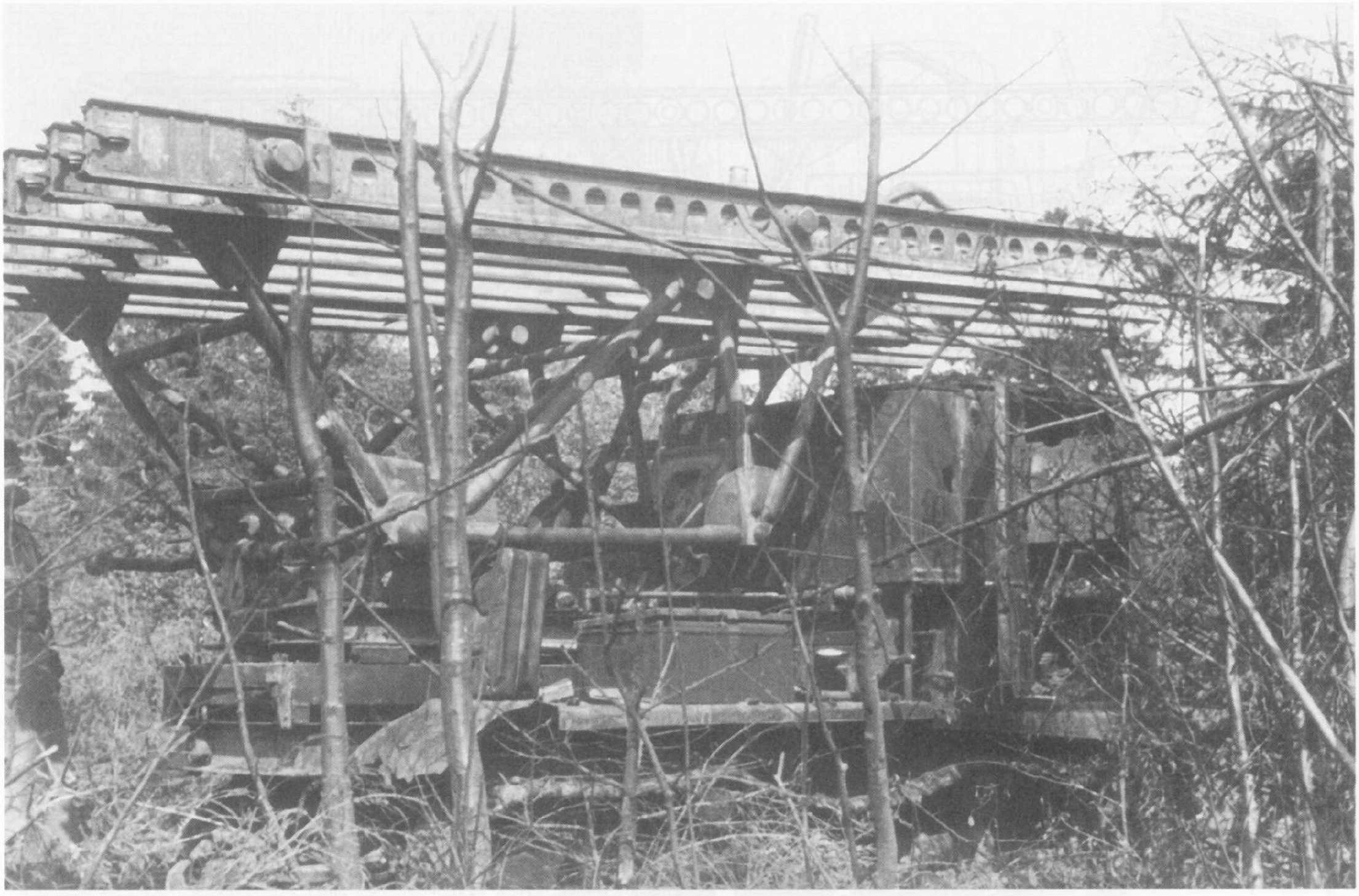
COMBAT ACTION

The first tests under combat conditions took place in the Far East. In air warfare against the Japanese air force in the Chalchyn Gol area in 1938, five Soviet fighters of the I-16 type, with launching rails for the RS-82 mounted under their wings, shot down ten Japanese bombers with the newly developed rockets in 85 combat missions.

The development and testing, as indeed the use, of the "Eresa" were strictly secret. The crews seem to have been recruited from reliable NKVD and police members. The weapon was not even shown to the Allied military attaches in Moscow after the Wehrmacht had already captured numerous examples of the rocket launcher. The concealment was also carried out at the highest level of command in the Red Army, with only members of the war ministry having access to the positions. This extreme secrecy resulted in Russian soldiers panicking the first time they went into combat because nobody had told them a thing about the new weapon.

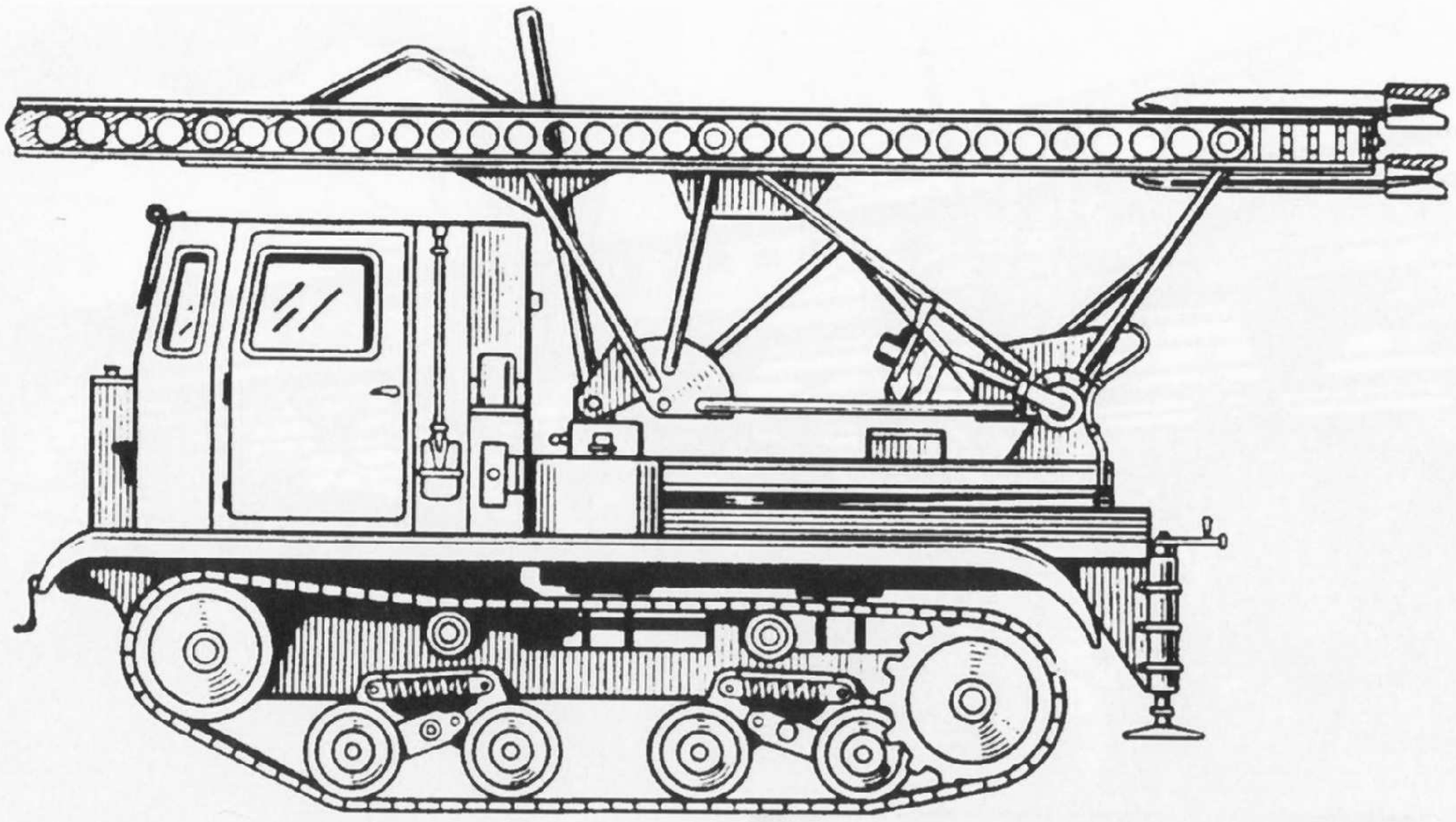
Stalin personally ordered the establishment of one small unit with the new rocket-salvo launcher, and ordered it to the hard-pressed central sector of the western front, where the German tank units led by Guderian were storming forward.

A captured BM-13-16 on ZIS-6 in the Yelna area, summer 1941. Very probably a vehicle from Captain Flerov's test battery.



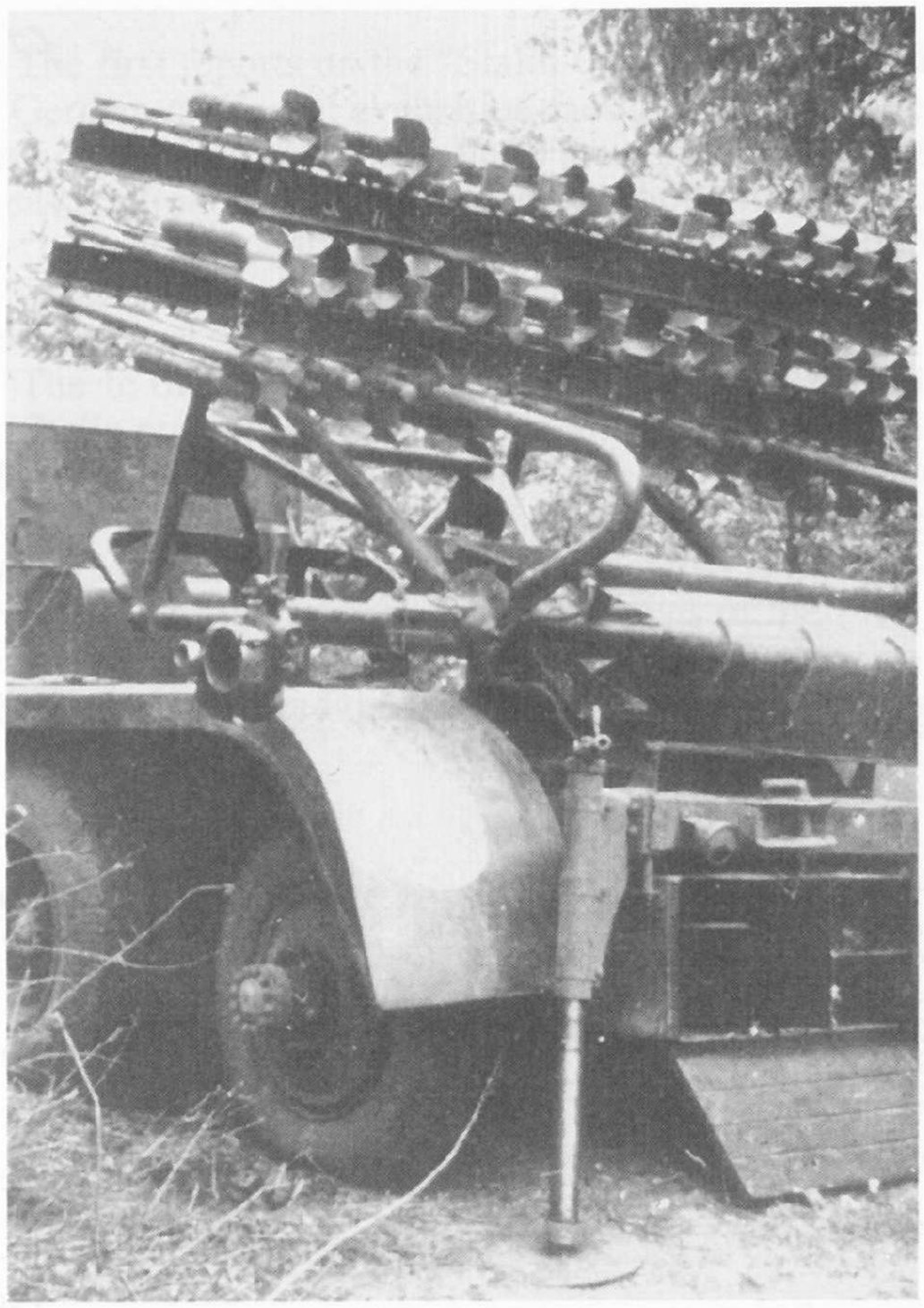
BM-13-16 STZ-5 Stalinez. (BAK)

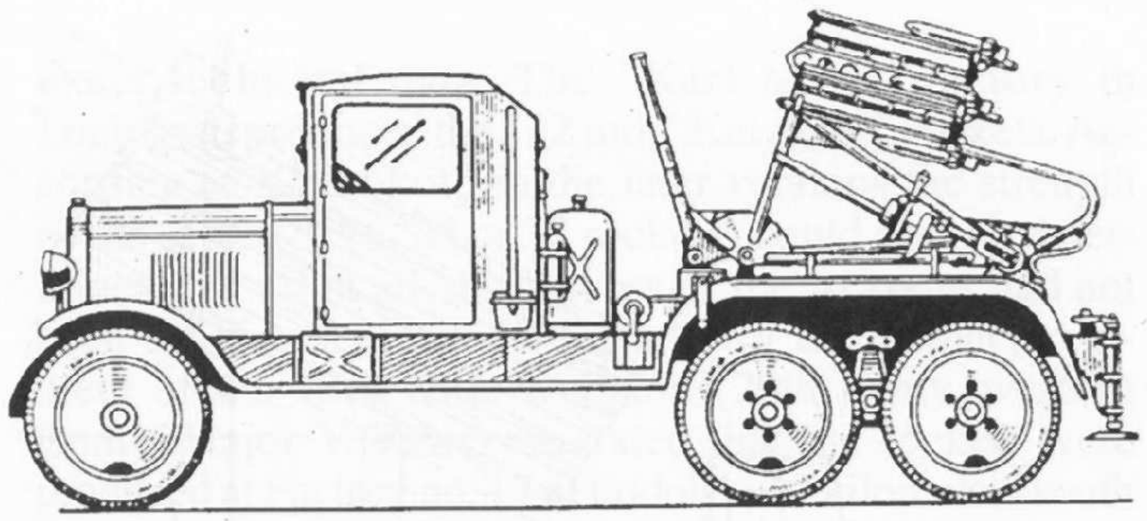
Below: Rockets of the M-13 type. In the background is an ammunition transporter of the Katyusha battery, probably a ZIS-5. The resemblance to the American Chevrolet of 1929 and the Ford AA of 1930 is obvious. Because of the similarity, it has been called the "Russki Ford." (BAK)



BM-13-16 on STZ-5 Stalinez

Eastern front, northern sector, autumn 1941. A captured Stalin Organ BM-13-16 on the STZ-5 Stalinez tractor. (BAK)





BM-8-36 on ZIS-5

Left:
Captured BM-8-36 on the eastern front, having lost its left rear dual wheel.

PRODUCTION FIGURES FOR THE "KATYUSHA"

1941: 980 1942: 3227 1943: ca. 3340
1944: ca. 2870 1945: ca. 770

The representative commander of the Soviet western front, Marshal Andrei Jeremenko, wrote: "In mid-July (1941) I was informed by telephone from headquarters that it was planned to use the "Eresa" in battle against the Fascists. They were being assigned to one unit. Test them and tell us what you think of them."

From the seven launching facilities in Moscow, the first independent rocket testing battery was set up on June 28, 1941, commanded by Captain I.A. Flerov. Several soldiers from the "Feliks Dzierzynski" Artillery School were assigned to this unit. Almost all the members of this new unit were chosen Communists or [Komsomolzen].

On July 13, 1941, German units reached and occupied Orsha, one of the most important rail connection points in the central sector. Just one day later, the railroad station was filled to capacity with German Wehrmacht trains and supply transports. On the same day, this station offered the target for the first combat action of the "Eresa" battery, equipped with the M-13 version. At 3:15 PM, a firefall began, lasting fifteen to twenty minutes; about a hundred 132 mm caliber rockets struck the railroad yards and the German trains; ammunition trains exploded, and flaming tank cars turned the yards into a sea of flame.

The second strike was carried out a short time later at the crossing point on the Orchiza River. By changing positions quickly, the battery was able to be used at various focal points in the central sector. Near the village of Wydra, the battery fired three salvos at intervals of eight minutes, with 336 rockets, at the German 3rd ID (mot.). In this combat it was regretted by the leading artillery officers of the Red Army that a splintering explosive shell, which would have had a heightened effect against "soft targets", had not been developed at the right time.

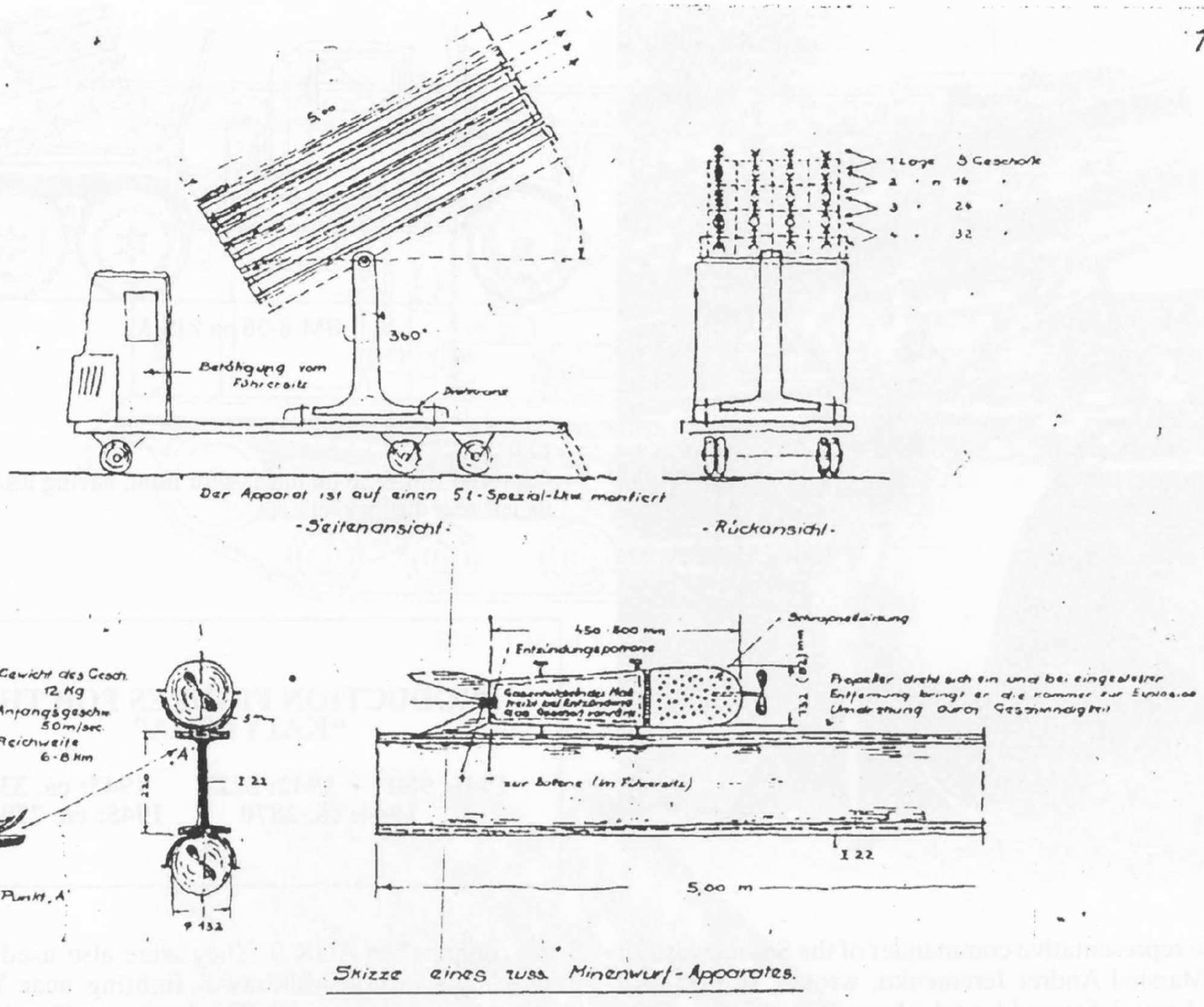
At Rudnya the battery's rockets hit the units of the 12th Panzer Division, which reported fire from "quick-firing cannons" to AOK 9. They were also used in the Red Army's heavy withdrawal fighting near Yelnia, Smolensk and Dorgobuch. The battery suffered heavy losses on July 26 and 27, 1941, when it crossed the Dniepr near Solovyovo. On October 10, Flerov received the order to transfer to the front area of the 43rd Army in the Roslavl area. One salvo was fired on the road to Spas Demensk. The battery tried to move out to the northeast. After the last salvos there came the order to march to Vyasma, but they were already in a gigantic pocket. The "Katyushas" were blown up, and the crews decided to break out of the pocket in the direction of Moshaisk.

In the night of October 7, 1941, a breakthrough attempt was made near the village of Bogatyr in the Smolensk area, against strong German forces. In this fighting, Flerov and most of the men were killed; only 43 men were able to break out of the pocket and flee into the forest. After a week they were able to reach the Russian lines.

The use of the "Katyusha" up to this point corresponded precisely to the guidelines that had been captured from the staff of the Soviet 313th Division. They stated that "the divisions and batteries of the M-8 and M-13 . . . were to see action only to fire on large and already recognized targets (larger infantry units, motorized units, tanks, artillery units and crossings)", and that firing on smaller troop units was "categorically forbidden."

After the first combat action it was seen that the "Katyusha" amounted to a striking innovation in weapons technology. The artillery leader of the Soviet western front, Major General I.P. Kramer, wrote:

"According to the reports of commanders of the rifle units and the observations of artillerymen, the striking force of such massed fire had caused the enemy high losses and had such a strong effect on morale that entire units panicked and fled . . ." This was not surprising, with



Skizze eines russ. Minenwurf-Apparates.

The rather amateurish-looking drawings of the FHO, based on the first statements from Russian prisoners of war.

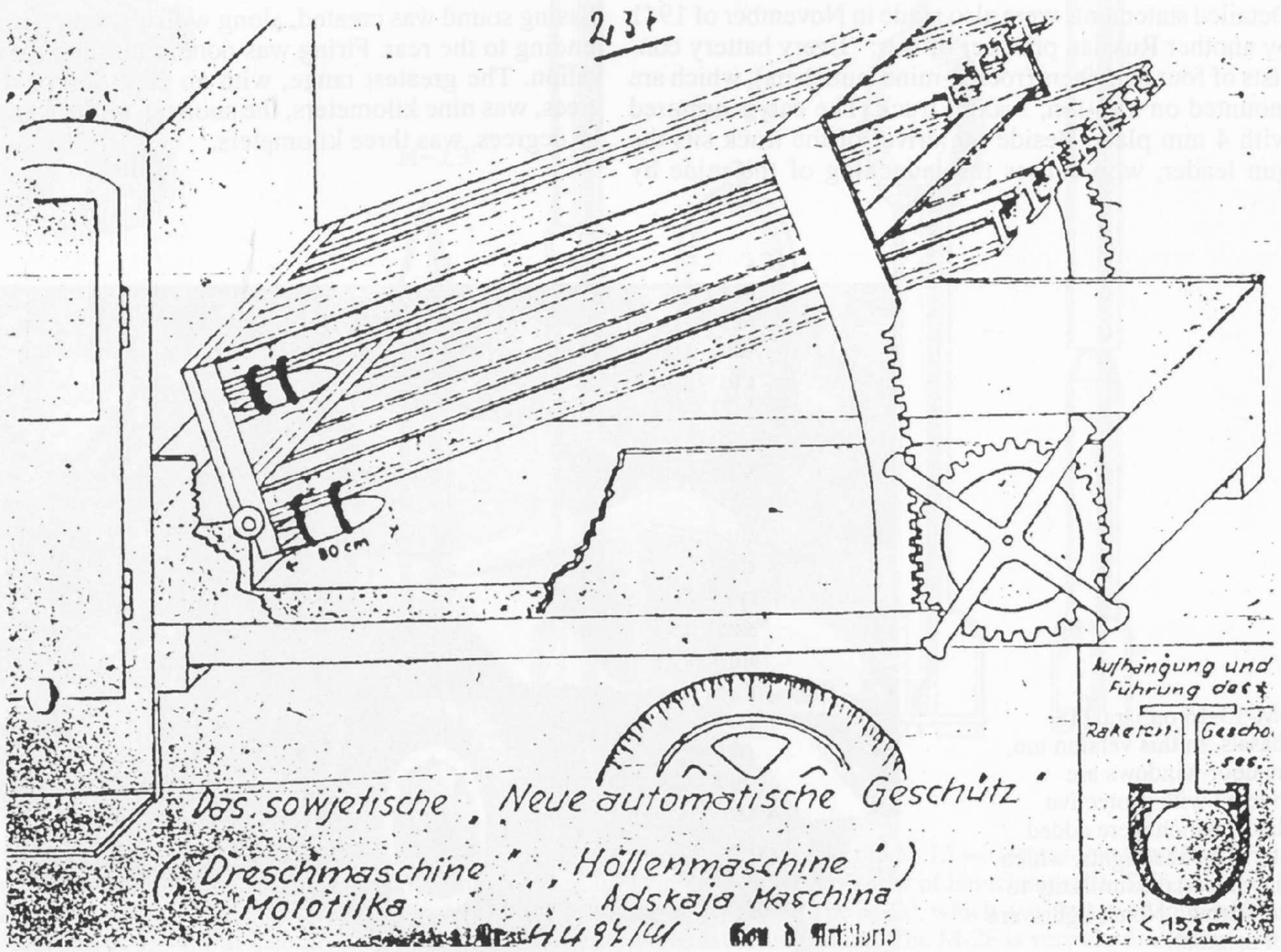
a firepower of 320 rockets in 26 seconds. The first German report on the salvo fire said:

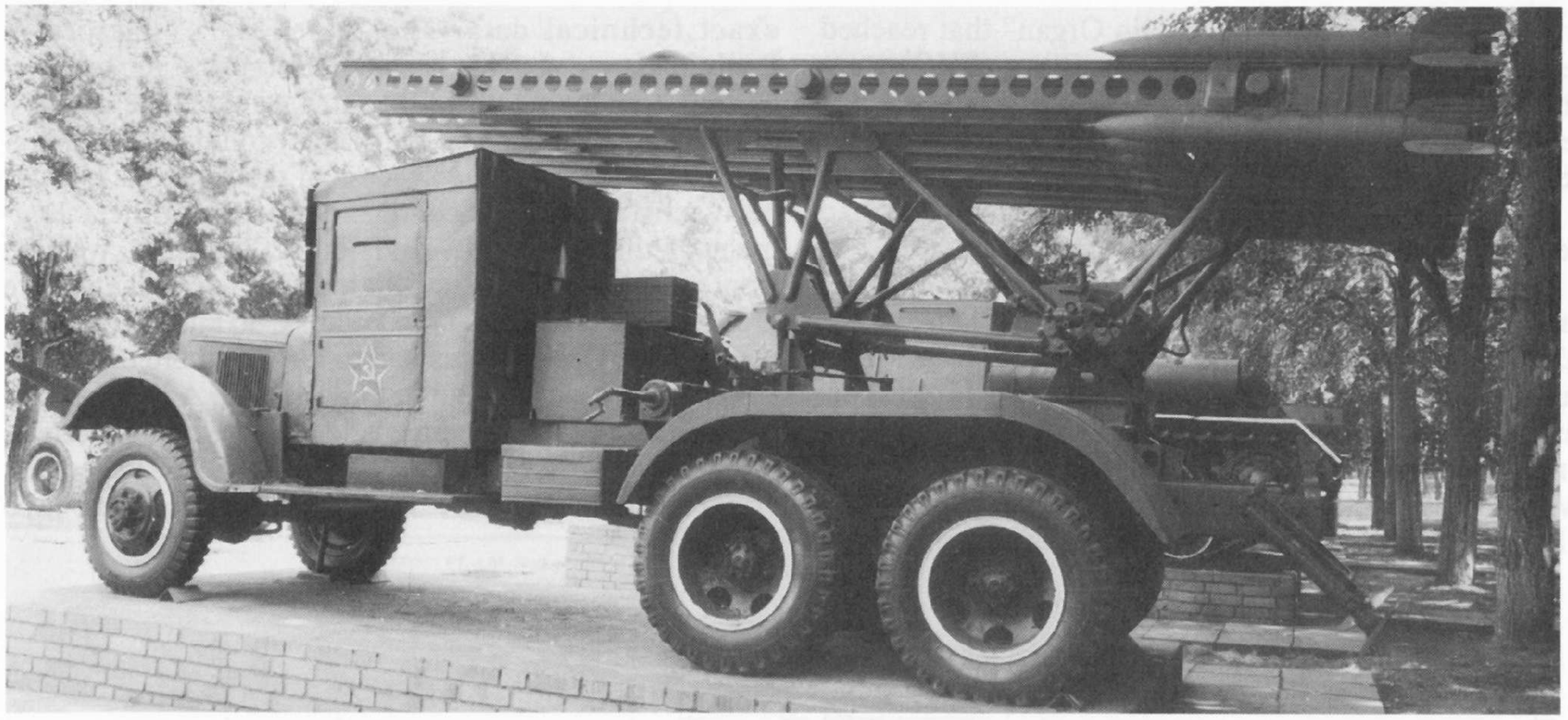
". . . dark clouds over the site of the launching, the rockets resembling the launcher grenades of our own fog launchers, the dull rustling of the flying projectiles, simultaneous landing with 30 to 40 cm deep impact holes. Despite meager shrapnel effect, the troops regarded being fired on with these launcher grenades, also because of their great scattering, as particularly unpleasant. Located pieces of the projectile bodies and statements from prisoners added to the observations until recently captured launchers provided final confirmation." The first functioning salvo launcher was captured during the smashing of the 34th Soviet Army by the LVI Panzer Corps (von Manstein) between August 19 and 23, 1941. On August 24, 1941 the General of the Fog Launchers at OKH noted that two immobile and fairly destroyed "Katyushas" had been discovered south of Starya Russa: Caliber circa 10 cm, 38 rails. The device had been photographed thoroughly from all sides, but on account of the weight of the device, it had not yet been feasible to take it away. The Army Group Command North reported on September 6, 1941 that a salvo launcher had been captured, 7.6 cm caliber, with 38 launchers, and that it had been sent to Hillersleben. The crew members had to sign a statement before going into action, stating that in case of danger, they would have to destroy the rocket launcher and themselves avoid being captured by the Germans, by suicide if necessary. In a captured order from Stalin and Marshal Chapochnikov dated October 1, 1941, it was stated: "All M 8 and M 13 military machines are to be regarded as fully secret technology of the Red Army. For this reason these machines and the ammunition for them must in no case fall into the hands of the enemy. These machines must be kept under a constant, particularly heavy and secure guard under all conditions. The responsibility for the preservation of secrets is placed upon the commanders of the fronts and the armies." But this could not always be carried out. In actual fact, though, the numbers of captured "Katyushas" in comparison to the numbers of units in action were remarkably low. In the secret records of the FHO (Foreign Armies East) from the beginning of the war to December 2, 1942, only 23 captured "Stalin Organs" are listed, with one more in January 1943 and thirteen more in February 1943. In the entire month of July 1943 (the offensive in the Kursk arc of the front), 57 "row launching devices" were captured. In December of 1943, the FHO registered a total of 145 captured "Katyushas" since June 22, 1941. The statistics of losses are incomplete, and appear in the listings of the FHO under the designation of "Reihenwurfgerät", and as of 1943 as "Salvengeschütz." The presumably greatest Soviet losses of rocket artillery were those recorded between July and December of 1943: in June 73 "Katyushas" were destroyed, in August 163, September 114, October 45, November 24 and December 9, for a total of 428. In comparison to the production figures in this period of time, this indicated a loss of about 25 percent. From January 1, 1944 to March 1945, 141 additional "Katyushas" were captured or destroyed.

The first reports on the "Stalin Organ" that reached the German staffs and evaluation facilities (FHO) were contradictory and confusing. From the northern sector of the eastern front there came reports that the Soviets would fire "torpedoes", and the Finnish headquarters reported on November 27, 1941 that rocket salvo launchers had been imported from the USA since September 1941.

The Ic of the AOK 4 noted on September 8, 1941 that Stalin organs had been fired in the hinterlands of the 263rd ID: "Similar to our Do-launchers." The Russian sources were more precise and informative. So said the Leningrad armament worker Serge Klotchkoff in October of 1941 to the interrogation specialists of the FHO, giving the production figures of his factory (Factory no. 218), which produced the 82 mm rockets, and providing exact technical data. The "Karl Marx" factory in Leningrad produced the 132 mm "Katyusha" rockets. According to Klotchkoff, in the later versions the strength of the salvo (8, 16, 24 or 32 rockets) could also be determined, but all in all, the success of the weapons had not been satisfactory. The commander of the artillery regiment of the 73rd Rifle Division (20th Army, western front), Major V. Zmieyev, stated that the rockets were produced at Factory no. 17 in Podolsk, 40 kilometers south of Moscow. Design plans had to be kept there to, and he would gladly locate them in Podolsk fell. A Russian soldier of the 161st Division made known to the German interrogation officer that the "Katyushas", also called "infernal machines" by the Russians, would fire at most two

Drawings of the "Stalin Organ" based on statements from Russian prisoners of war. It is noteworthy that such a version (firing over the rear, carrying the rockets on the underside of the I beams, and particularly the height adjustment with gear adjustment) is reminiscent of a first experimental model.

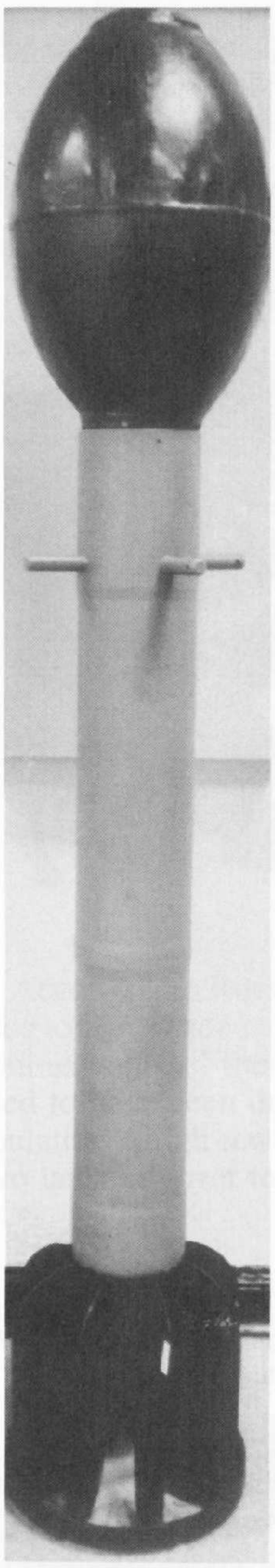




BM-13-16 on UralZIS. The battery cases behind the cab and the folded-down rear jacks are easy to see.

salvos. And the Pz. AOK 1 noted the statement of Lieutenant Posdayev on November 3, 1941: according to him, a battery consisted of, in all, 21 vehicles and six or seven officers: a battery chief, his deputy, one commissar and three or four platoon leaders. The 8th Guard Minelauncher Regiment had been set up at Aprilevka from the end of June to mid-September 1941. Posdayev himself belonged to the 2nd Guard Minelauncher Regiment, which saw its first combat service in the Stalino (Belozerkovka) area. Detailed statements were also made in November of 1941 by another Russian prisoner of war: "Every battery consists of four launchers (rocket-mine launchers), which are mounted on a (5-ton, 3-axle) truck. The cab is armored with 4 mm plate. Beside the driver of the truck sits the gun leader, who causes the launching of the mine by means of electric ignition from his seat by using a switchboard at the right side of the instrument panel. Along with every gun there are two (2-ton) trucks that serve as ammunition carriers, being loaded with 32 mines each (two mines per crate)." The gun crew, it was said, consisted of seven men: K 1 gunner, K 2 in charge of elevation, K 3 to K 6 loaders, K 7 gun leader. The truck was anchored before launching the mines by two jacks located at the rear end. when the mines were launched, a very strong and hissing sound was created, along with a strong flame extending to the rear. Firing was done according to observation. The greatest range, with an elevation of 45 degrees, was nine kilometers, the shortest, with an angle of 15 degrees, was three kilometers.

BM-13-16 on UralZIS chassis. In this version too, the door windows are covered with protective plates, which were added later. The headlights, which show a certain similarity to the German Notek lights, are not original.



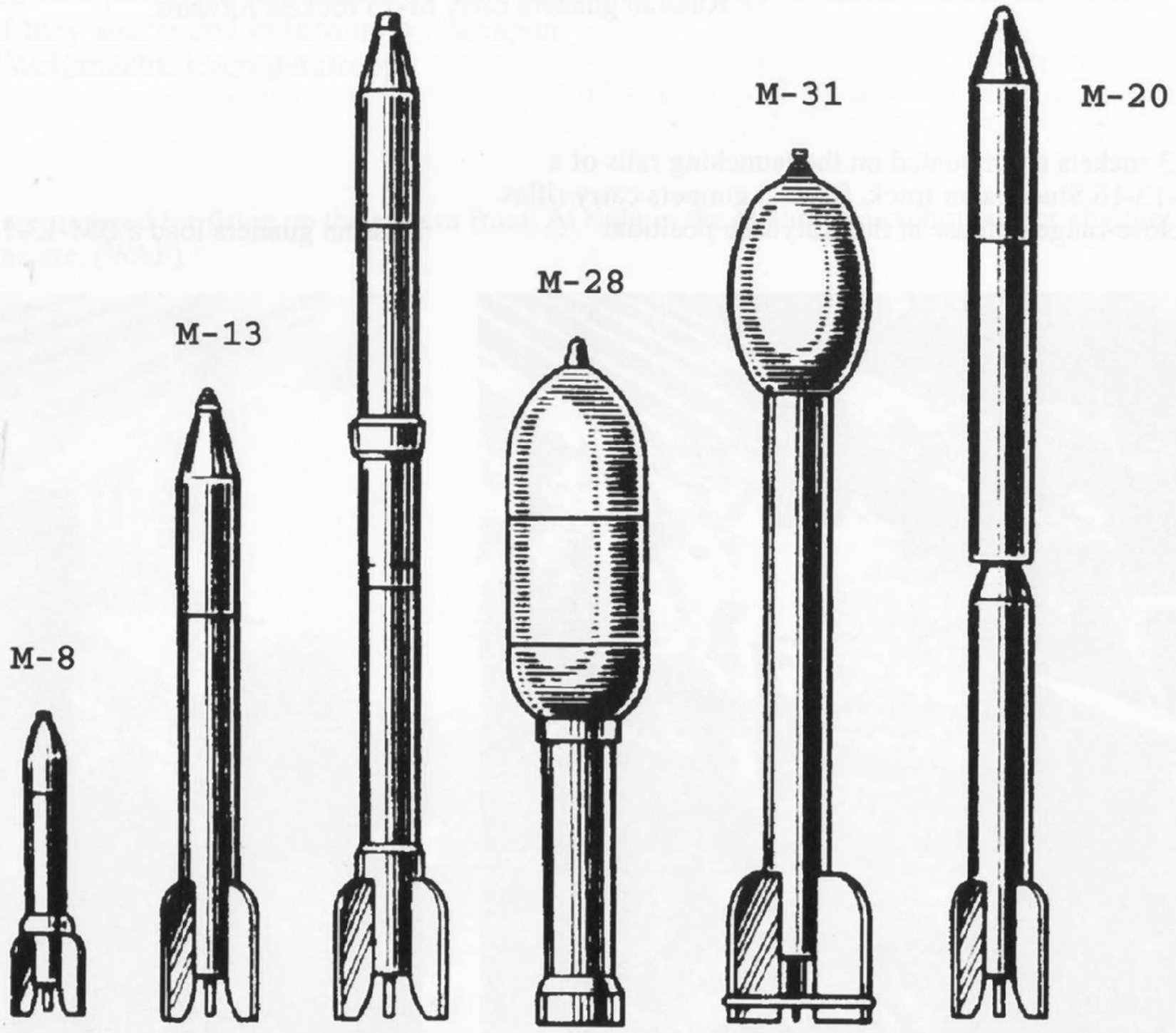
Technical Data

Type	Caliber	Fins	Length	Weight	Warhead Weight	Explosive Weight
M-8	82 mm	4	0,57 m	8,0 kg	3,05 kg	0,54 kg *
M-13	132 mm	4	1,42 m	42,5 kg	18,5 kg	4,6 kg
M-13-UK	132 mm	4	1,42 m	42,3 kg	18,5 kg	4,6 kg
M-13-DD	132 mm	4	2,12 m	62,5 kg	18,5 kg	4,6 kg
M-20	132 mm	4	2,09 m	57,0 kg		18,4 kg
M-28	280 mm	-	1,19 m	83,7 kg		60,0 kg
M-30	300 mm	8	1,20 m	72,0 kg		28,9 kg
M-31	300 mm	8	1,76 m	94,6 kg		28,9 kg
M-31-UK	300 mm	8	1,76 m	94,6 kg		28,9 kg

* Tetryl

Range	Launching Frame		Top Speed	Thrust
5,5 km	BM-8-48 (24)		315 m/sec.	450 kg
8,5 km	BM-13		355 m/sec.	2000 kg
7,9 km			335 m/sec.	2000 kg
11,0 km	BM-13-Ch	620 m/sec.	4000 kg	
5,0 km			260 m/sec.	2000 kg
1,9 km			-	-
2,8 km			-	2000 kg
4,3 km	BM-13		255 m/sec.	2500 kg
4,3 km	Rahmen M-30		235 m/sec.	2500 kg
	BM-31-12			

Left:
An M-31 UK rocket in the museum of the western group of the GUS forces in Wünsdorf. The color of the rocket as used in combat was green; a different color of paint (such as red fuses) was used for the vehicles displayed in the museum.

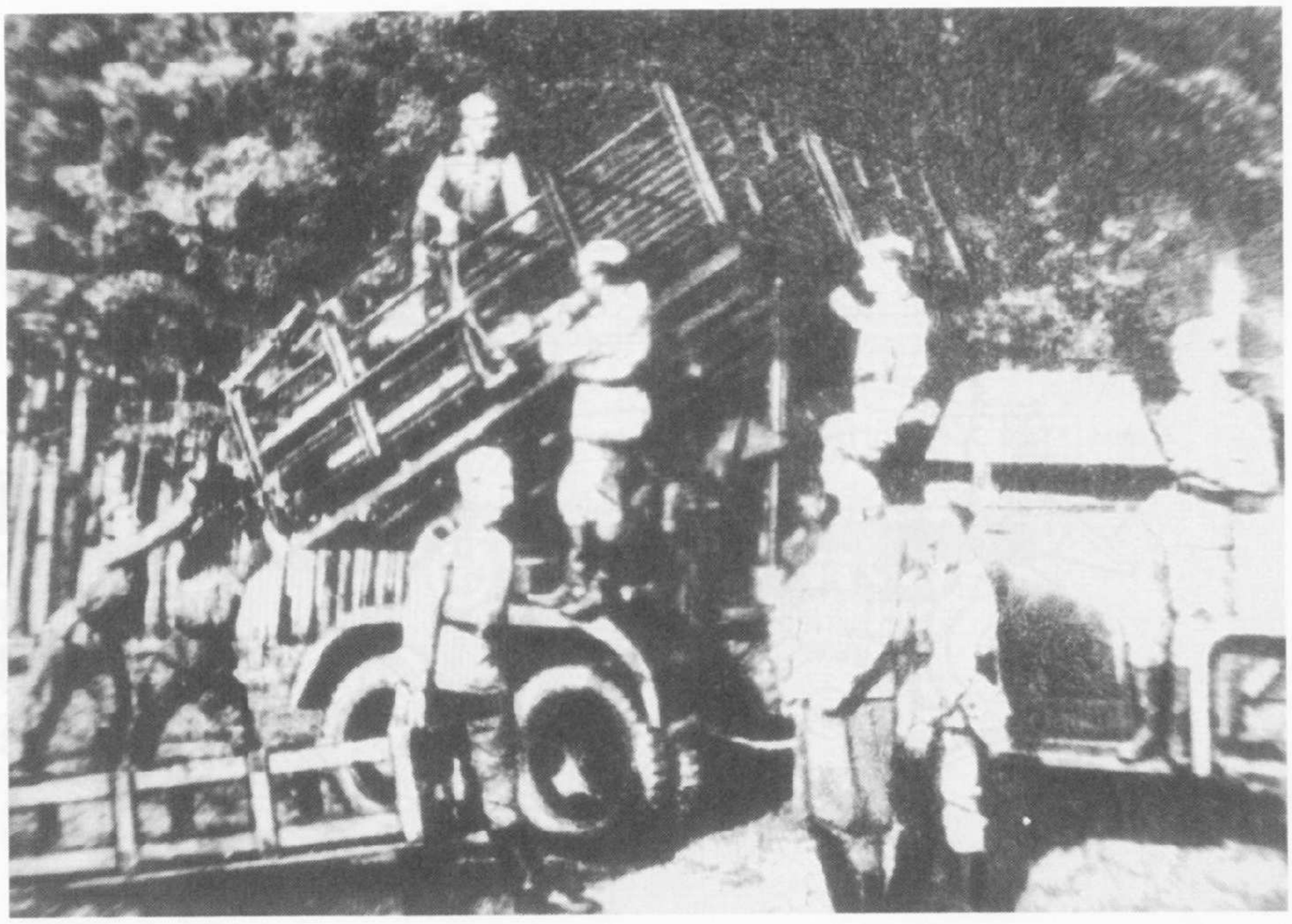


Various calibers of Katyusha rockets: The M-13-DD was a long-distance version of the M-13 with two rocket motors, mounted one over the other, that ran simultaneously. It was fired only from the upper row of launching rails. This rocket first appeared in the southern sector of the eastern front in the summer of 1943. The M-20, which was first used in combat in the autumn of 1944, was also fired only from the upper rails of the launching frame. The M-28 is very similar to the German 28 cm Wurfkörper (Spr.) used by the fog-launcher troops.

Russian gunners carry M-13 rockets forward.

M-13 rockets are mounted on the launching rails of a BM-13-16 Studebaker truck. Several gunners carry rifles for close-range defense at the Katyusha position.

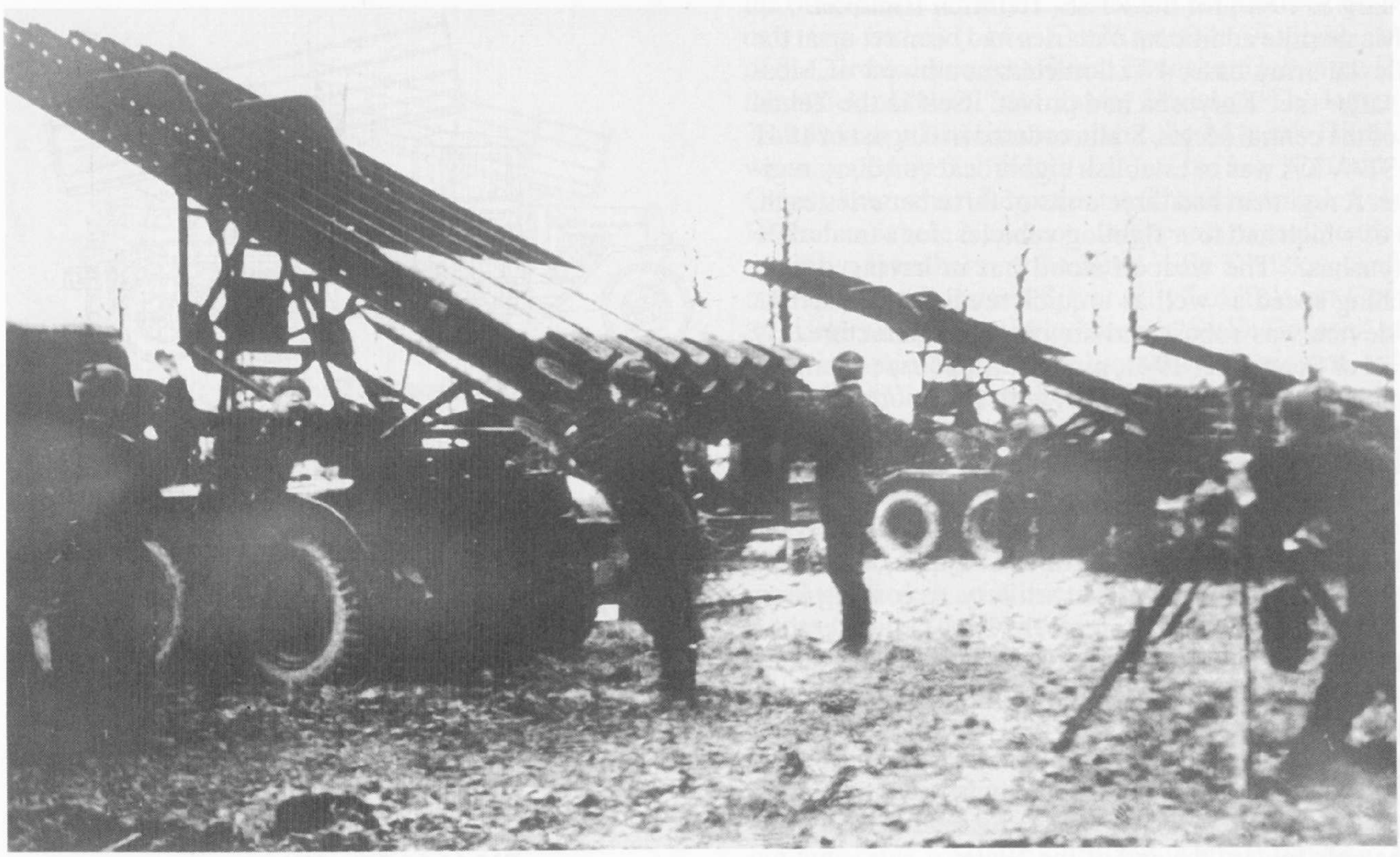
Russian gunners load a BM-13-16.

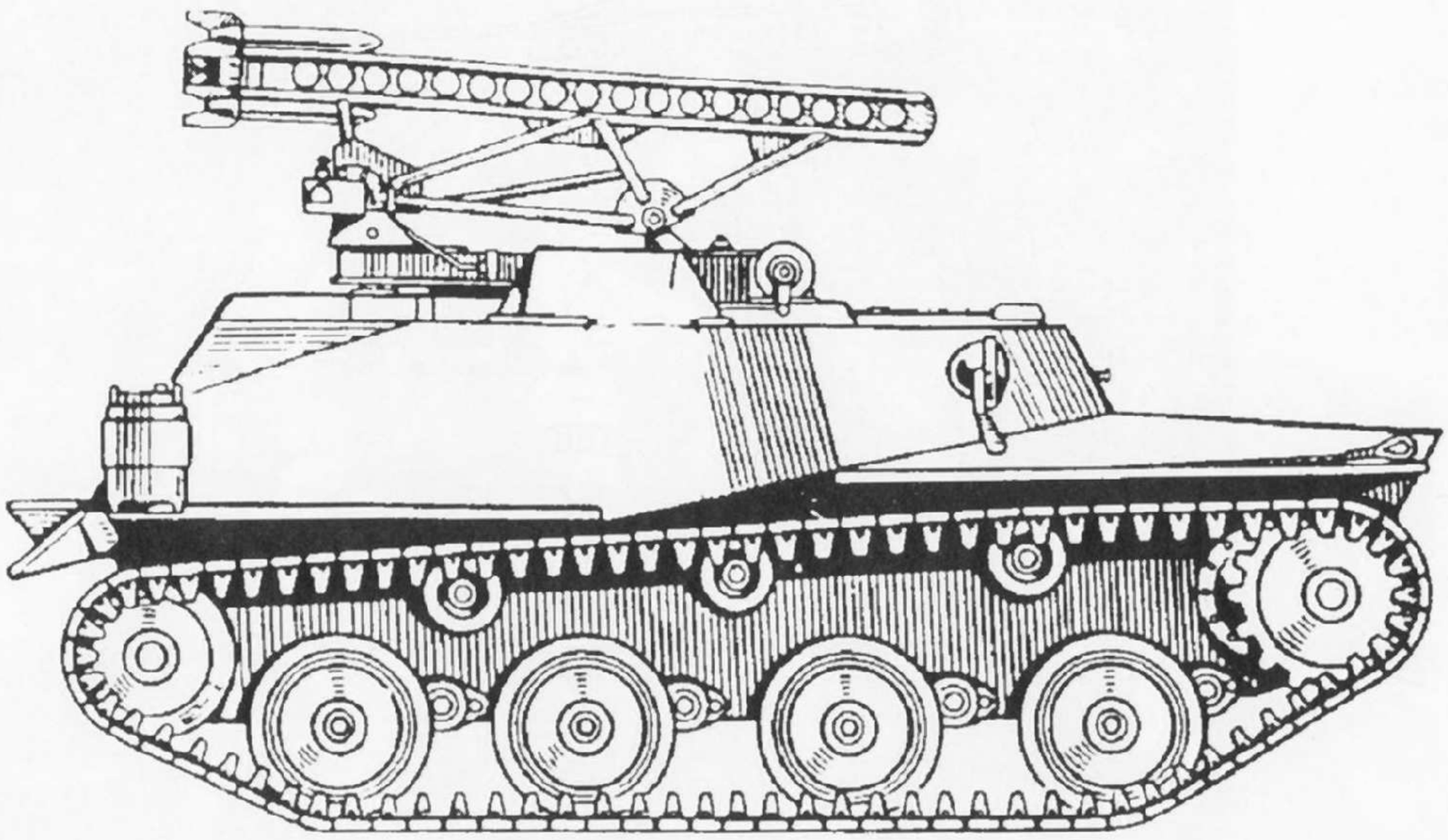


A BM-31-12 is loaded. Notice the wooden ammunition cases, similar to those of the German launching frames.

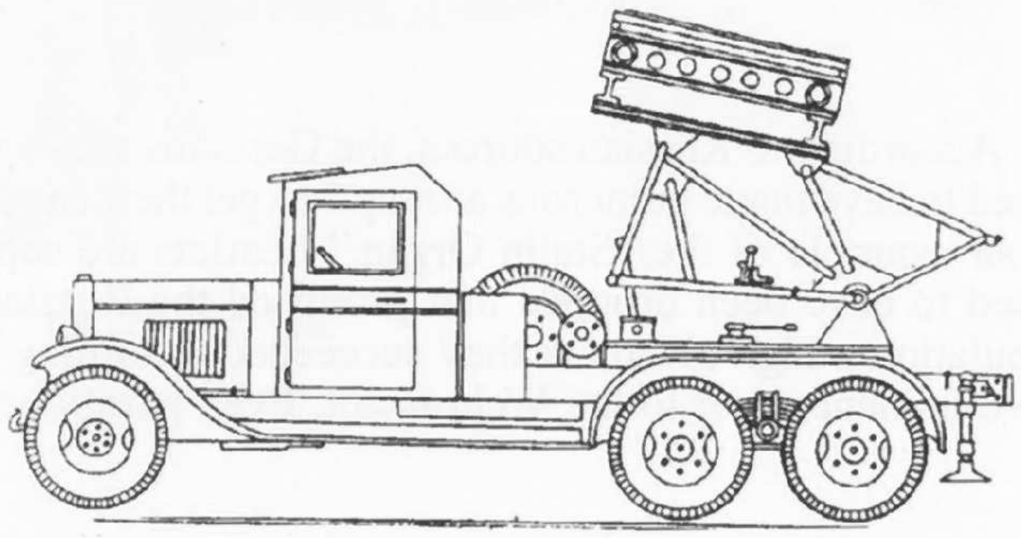
According to Russian sources, the Germans are supposed to have made numerous attempts to get their hands on an example of the "Stalin Organ." Leaflets are supposed to have been dropped that promised the Russian population a high reward if they succeeded in turning a salvo launcher over to the Wehrmacht. Even paratroopers and members of the "Brandenburg Division" in Russian uniforms had gone behind the Russian lines in search of a "Katyusha." In fact, the Wehrmacht undertook several attempts to acquire information about this new weapon.

BM-13-16 Katyushas are being prepared for firing on the eastern front. At right in the picture is a collimator for aligning the launcher and measuring the arc. (WAF)





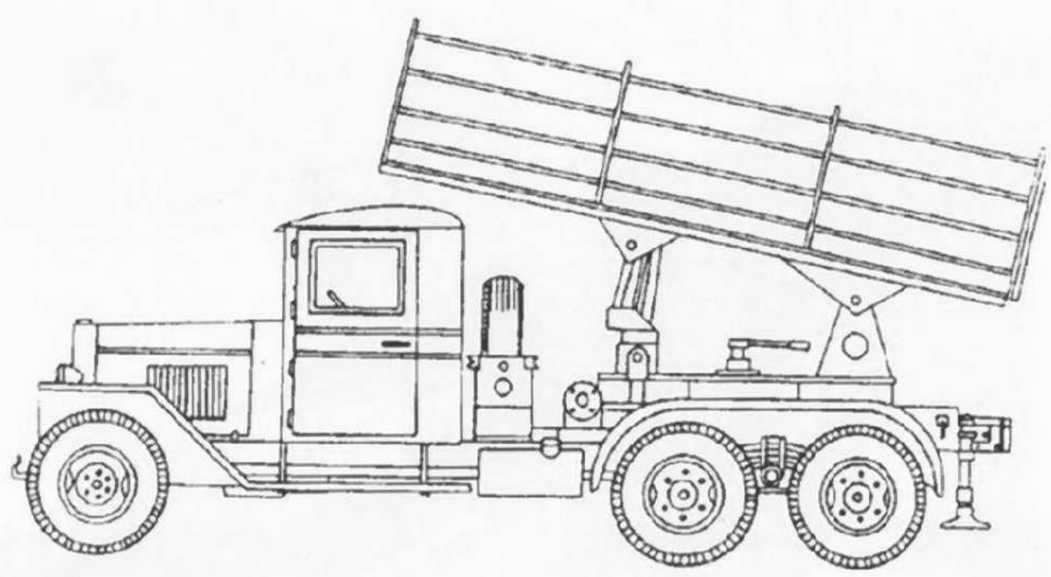
BM-8-24 on T-60



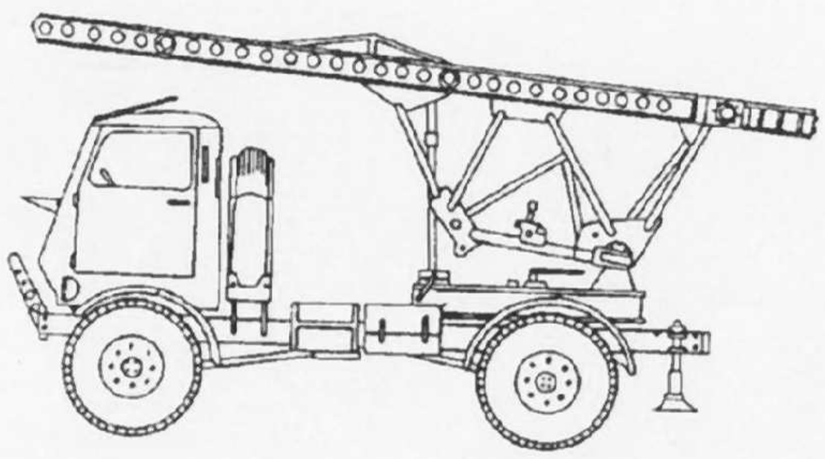
BM-8-36 on ZIS 6

Ordnance Battalion 22 reported to the OKH on December 5, 1941, that 50 kilometers north of Berdyansk, in Andreyevska, the presence of a new kind of Russian mine wagon "for the simultaneous launching of 36 mines by means of electric ignition" had been confirmed. Specimens that had not been destroyed were sent to the Reich, where they would be displayed to interested parties at troop training bases, as was done at Kummersdorf on February 8, 1943, for the RFSS, Heinrich Himmler.

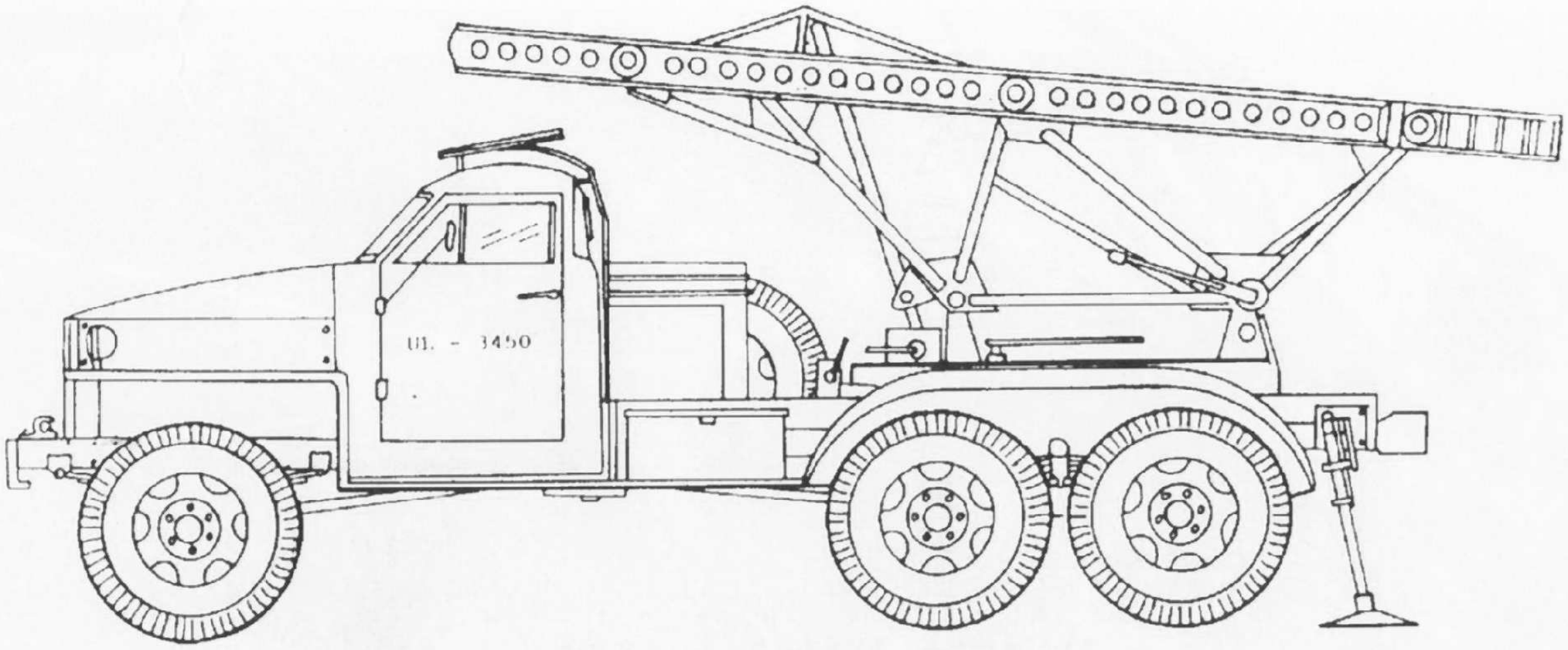
Meanwhile additional batteries had been set up at the Aprilevka army base, 47 kilometers southwest of Moscow; after the "Katyushä had proved itself in the Yelnia area of the central sector, Stalin ordered in August of 1941 that STAVKA was to establish eight rocket artillery regiments. A regiment had three units of three batteries each, each of which had four fighting vehicles, for a total of 36 "Katyushas." The weapon stood out in having a high marching speed as well as a quick readiness for action. The device was robust and simple to manufacture. By the end of September 1941, nine guard grenade-launcher regiments had been established, with five more set up in October 1941. During the rest of the war, new "Katyusha" units were established. By the beginning of 1945, the Red Army had seven divisions, forty independent brigades, 105 independent regiments (according to FHO analysis, a regiment had an ideal strength of 695 men), and forty independent divisions of rocket artillery. According to an OKH announcement of September 12, 1941, at that time there were supposed to be three Russian salvo batteries in action on the eastern front: one with the 19th and two with the 30th Russian Army. In 1944 and 1945, the "Katyusha" also saw service in the units of the Polish Berling Army, though the rocket launchers were manned exclusively by Russians. They were turned over to Polish troops only toward the end of the 1940s.



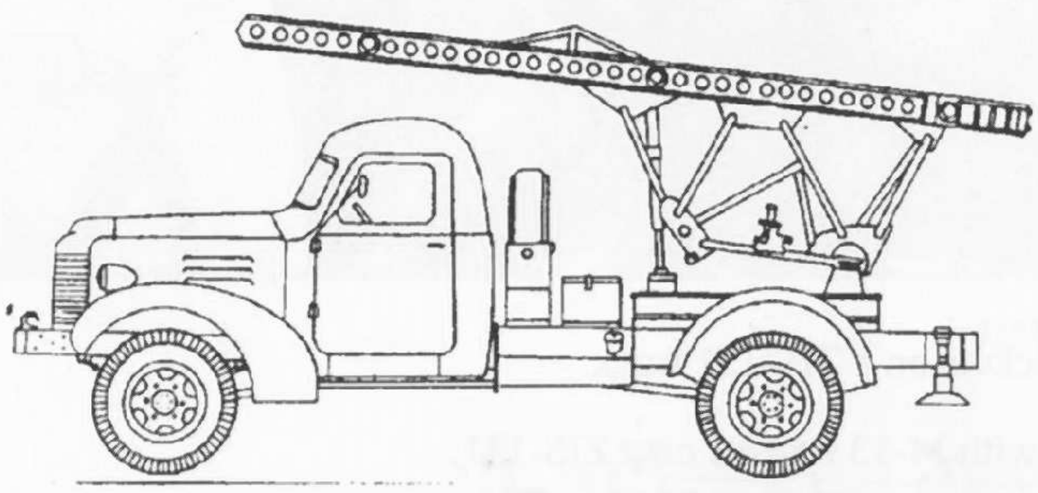
BM-31-12 on ZIS 6



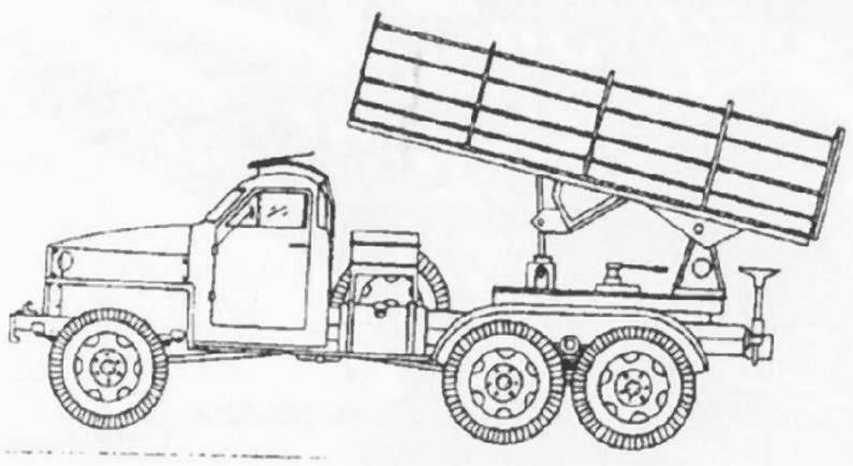
BM-13-16 S Ford Wot 8



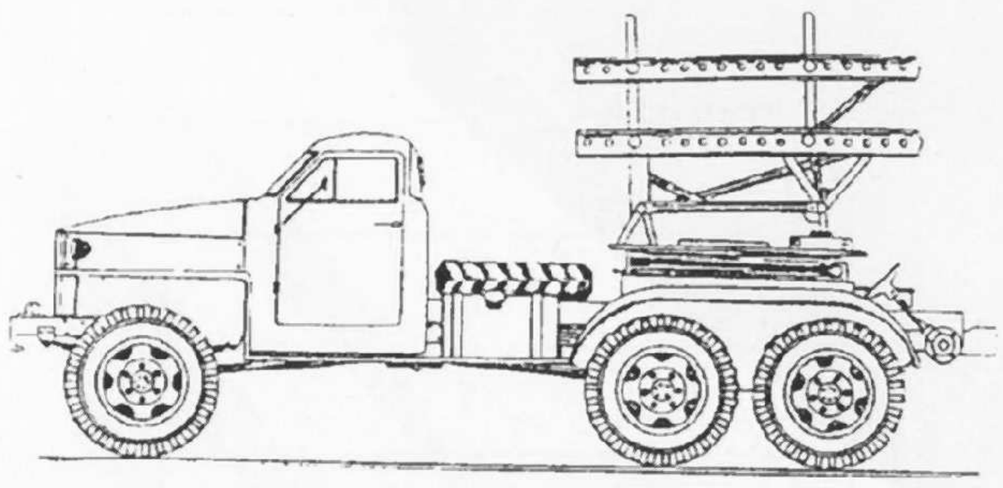
BM-13-16 Studebaker US-6



BM-13-16 S International Harvester



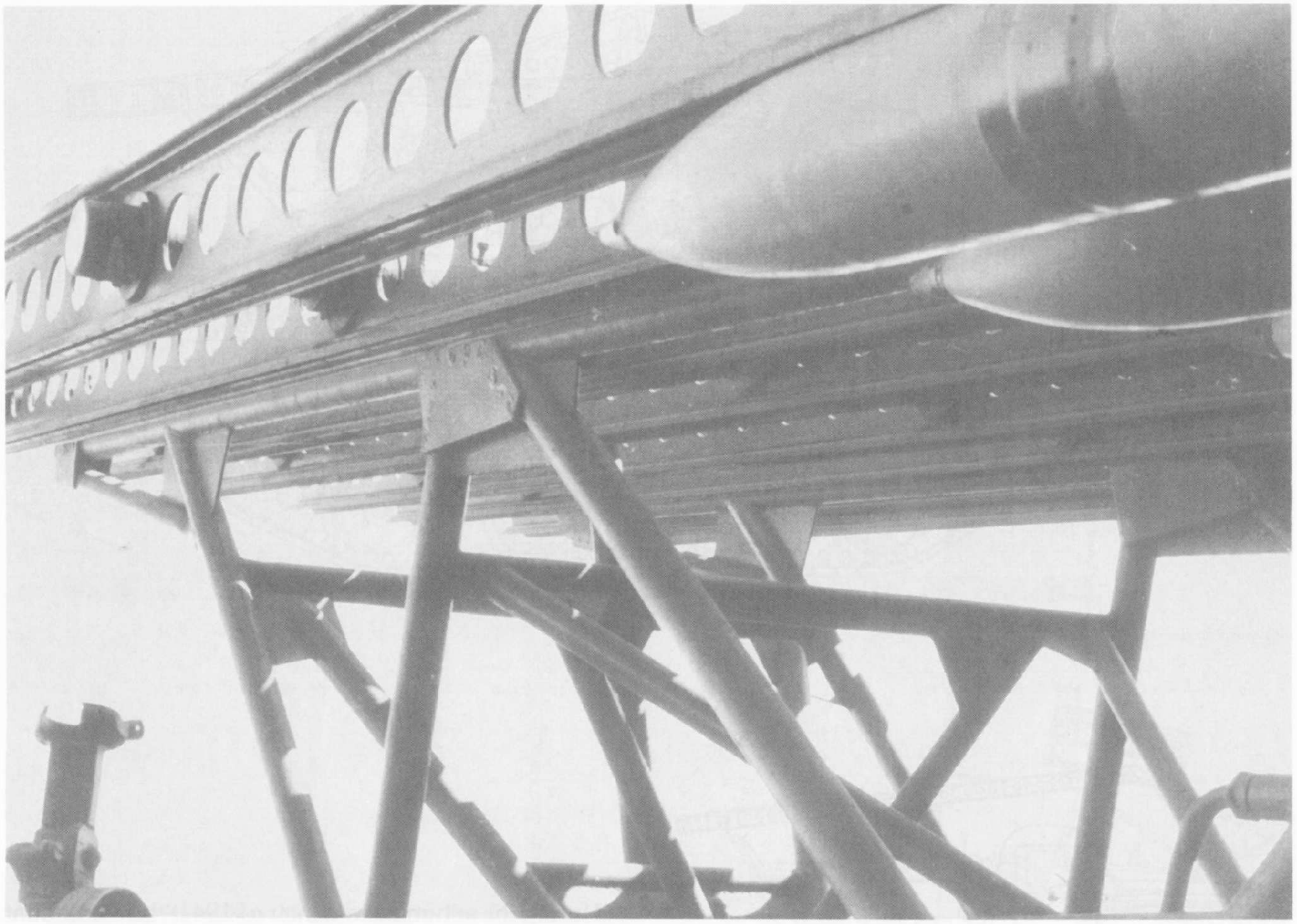
BM-31-12 Studebaker US-6



BM-8-48 Studebaker US-6

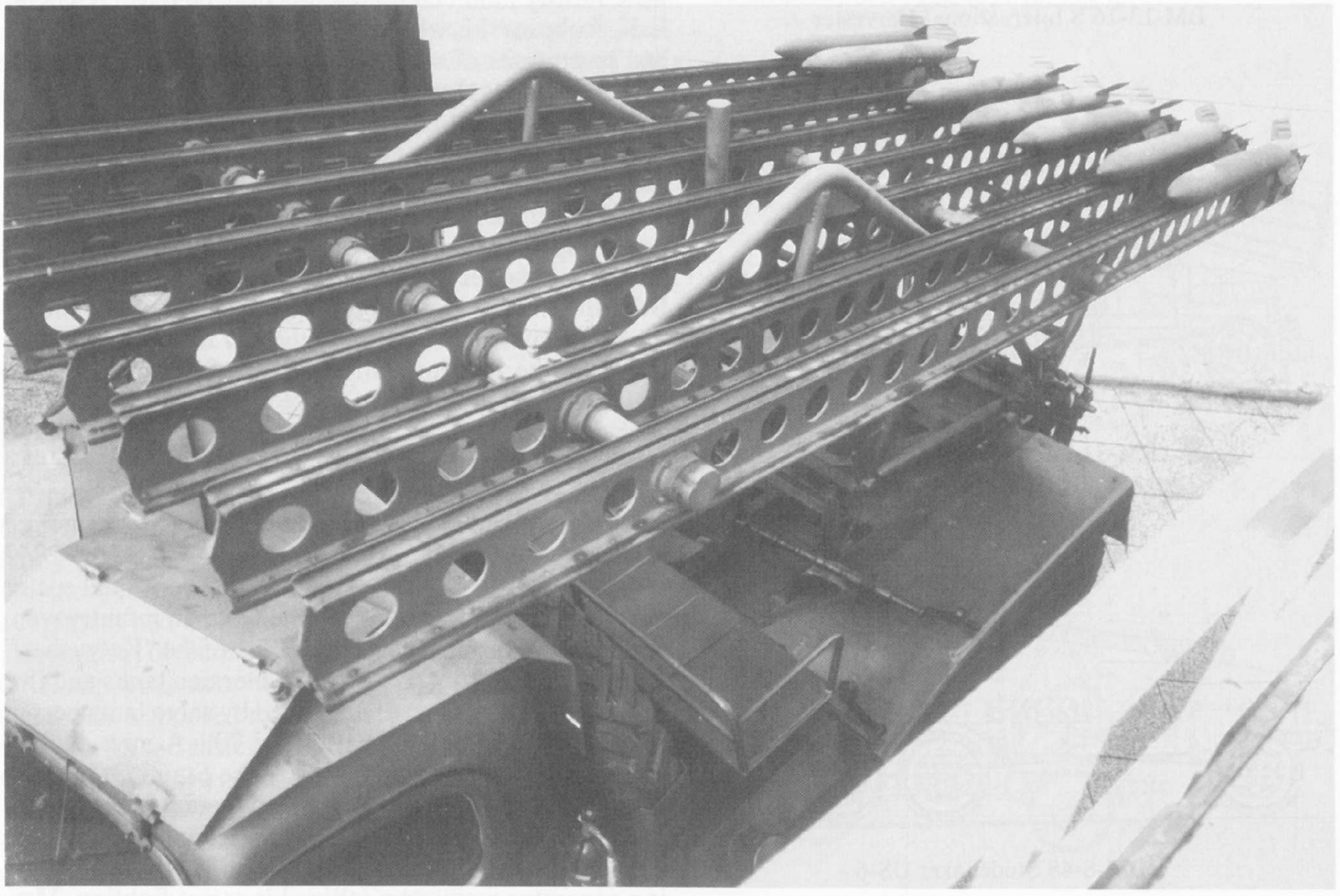
During the autumn and winter of 1941, the paramount goal of the Red Army was the defense of Moscow. The "Katyushas" produced in the Russian capital were sent directly to the front, but the ZIS-6 trucks were soon bogged down in the autumn mud. Now the launching rails were hastily mounted on tractors or T-60 tanks. General K.K. Rokosovski, who covered the Volokolamsky road, had seven units of salvo launchers in the 16th Army. All the other armies that defended their positions in the Moscow area had only two. On November 16, 1941, salvos of the 23rd independent Guard Launcher Unit turned back the attack of the 217th Infantry Division. The legendary 78th Infantry Division too, later the "Assault Division", was stopped by the "Katyushas" of the 1st, 17th and 13th Guard Launcher Regiments. The historical field of Borodino, where Napoleon was beaten, was defended by the salvo launchers of the 32nd Rifle Division. And the taking of the Russian "Silver City" of Tula on October 30, 1941 was prevented by twelve "Stalin Organs" of the 34th independent Guard Launcher Regiment, which caused the Wehrmacht heavy losses.

In the southern sector of the eastern front, the launcher regiments of the 62nd, 64th and 57th Soviet Armies fired a total of 189,417 rockets by October 1942. Of the 2865 salvos fired, 2084 (70%) were fired in the frontal sector of the 62nd Army. Assaults by the German infantry were regularly broken up at once by the fire of the "Katyushas." According to Soviet sources, 226 German tanks and five self-propelled guns were destroyed by salvo launchers in the defensive areas of the 13th and 70th Armies, and 45 attempted assaults were stopped. The Stalin Organ also saw service in the Stalingrad area, where it played a major role in preventing the 6th Army from escaping from the pocket at Stalingrad. The BM-8, BM013 and launching apparatus were even utilized in street fighting. Mar-

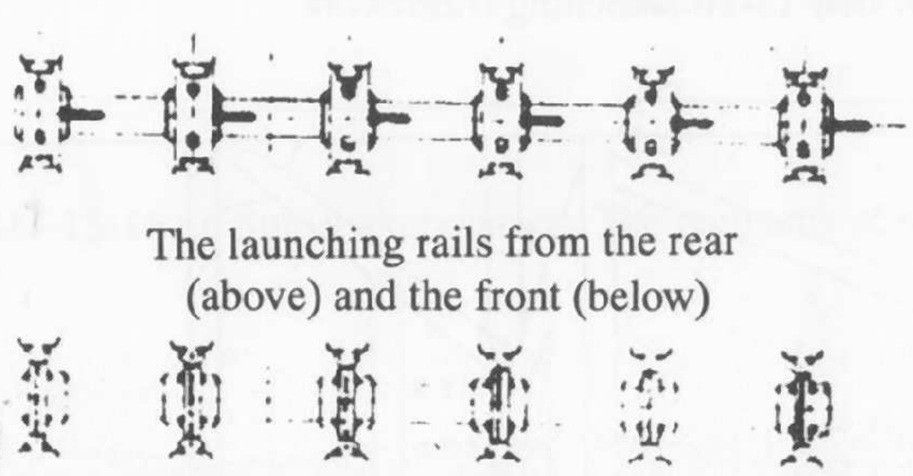


Launching rails for M-13 rockets on a ZIS-151 truck.

Below: view of a launching frame with M-13 rockets on a ZIS-151.



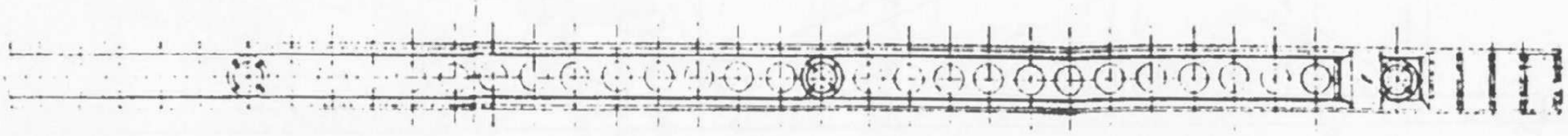
BM-13-16 launching rails



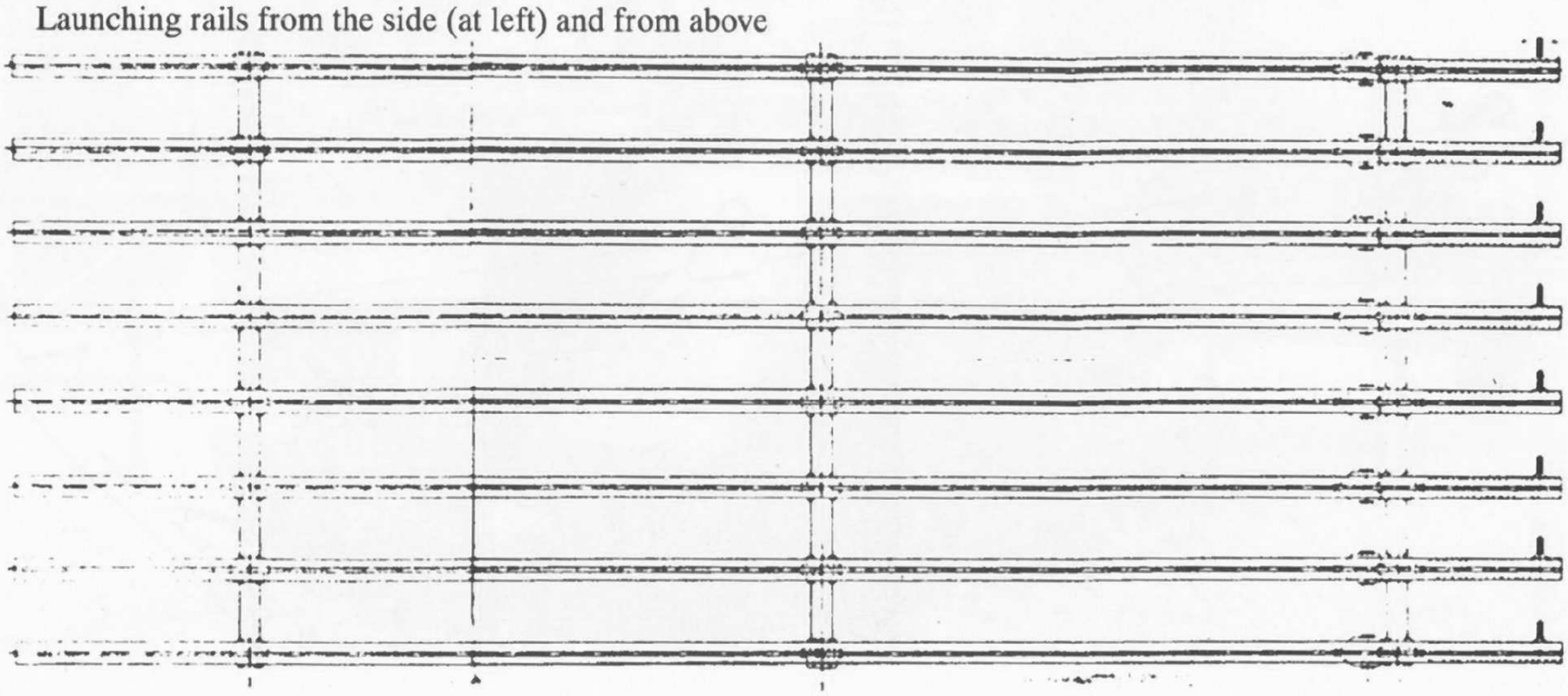
The launching rails from the rear
(above) and the front (below)

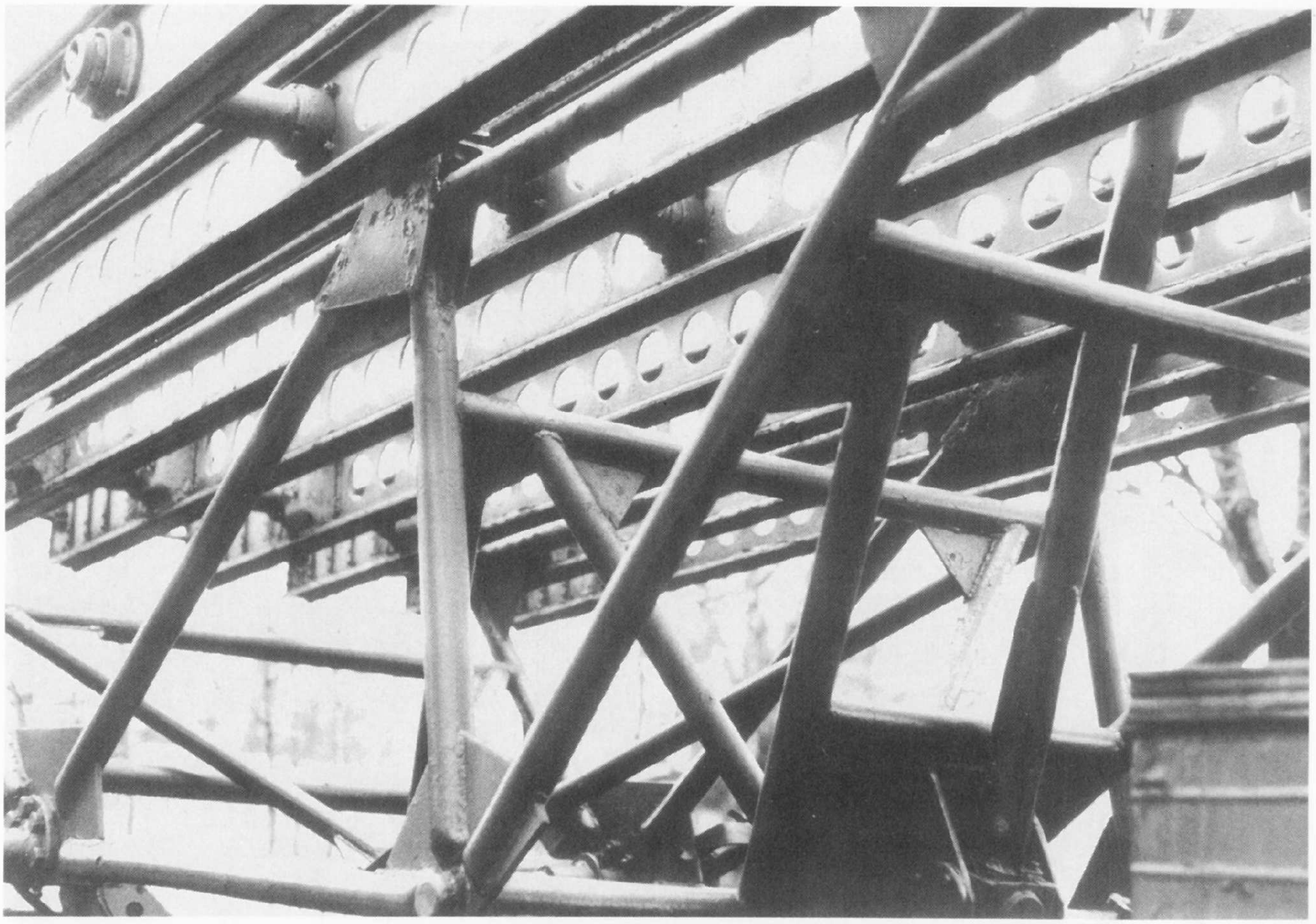
Lock

BM-13-16 launching rails



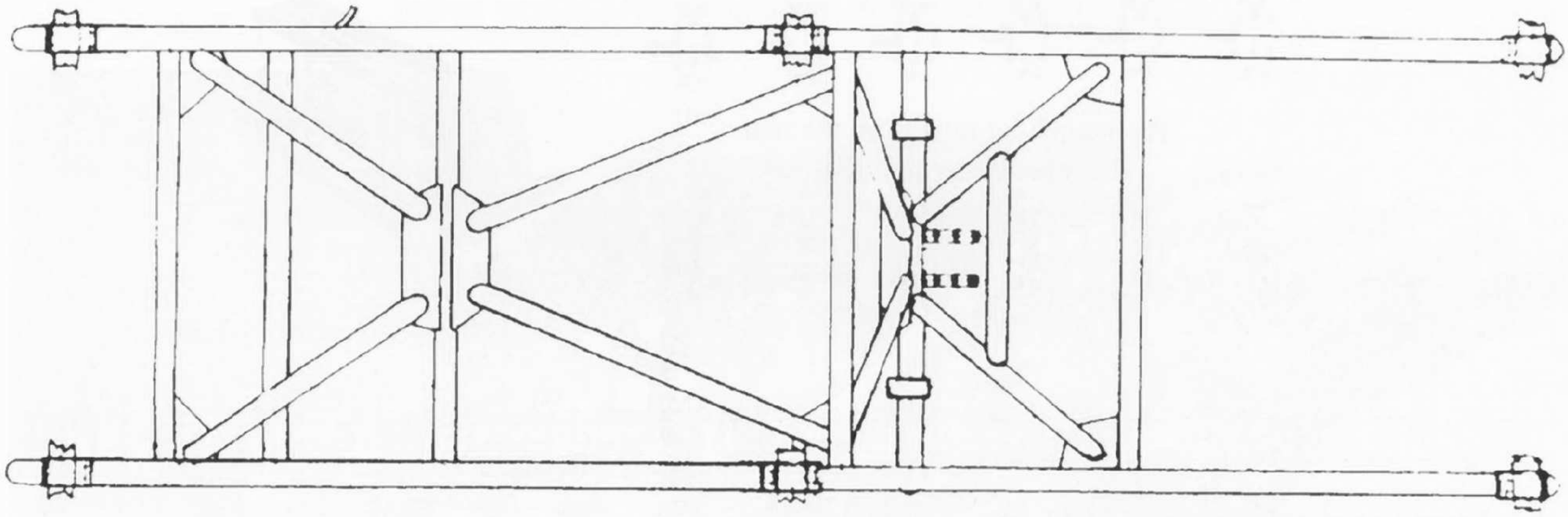
Launching rails from the side (at left) and from above

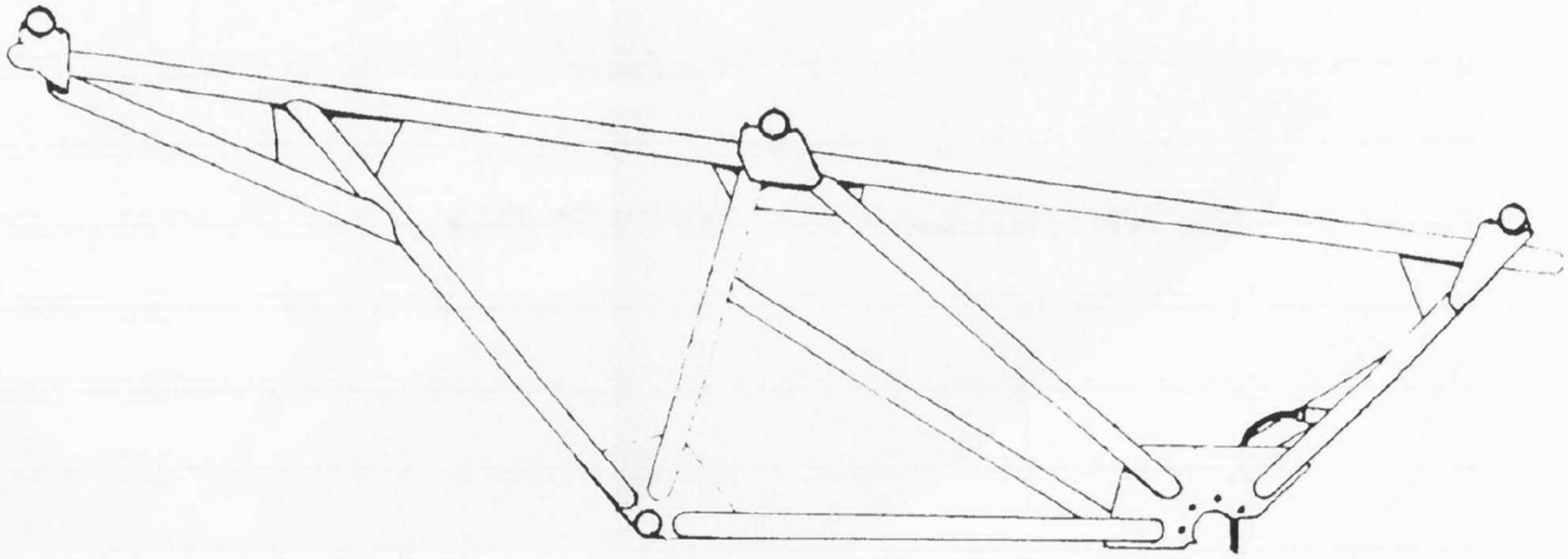




BM-13-16 framework and launching ramp

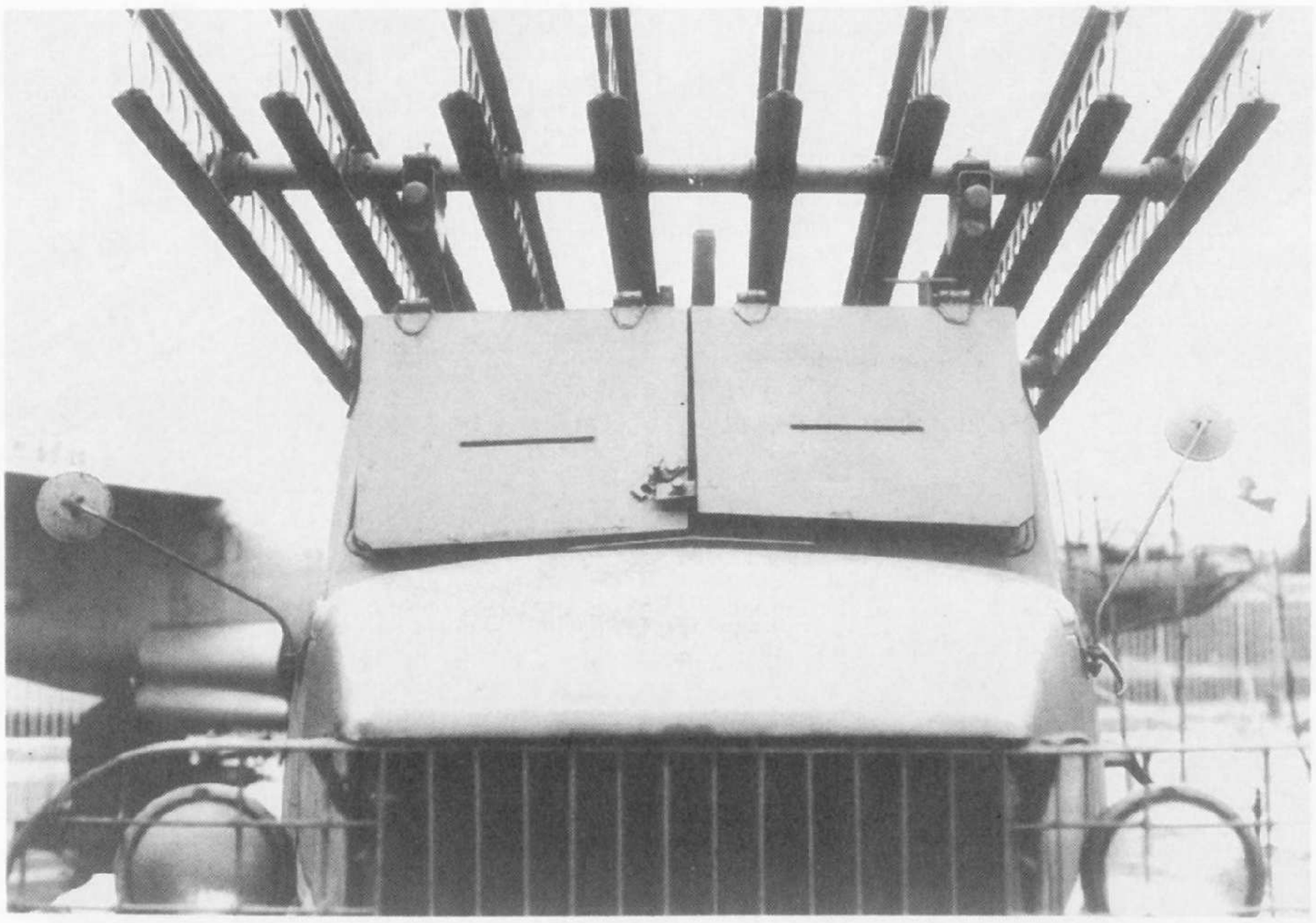
Below: BM-13-16 launching framework



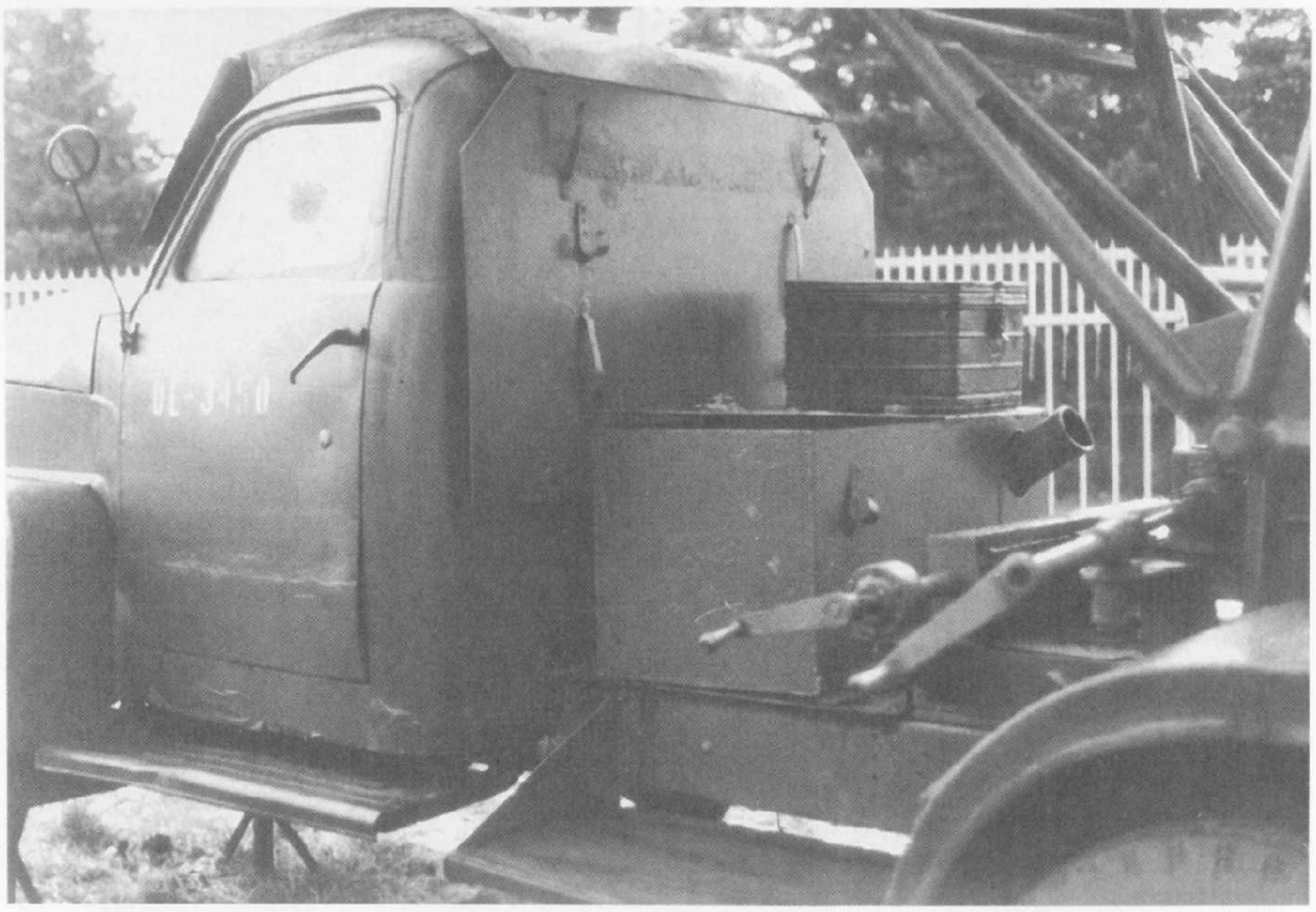


BM-13-16 on Studebaker chassis

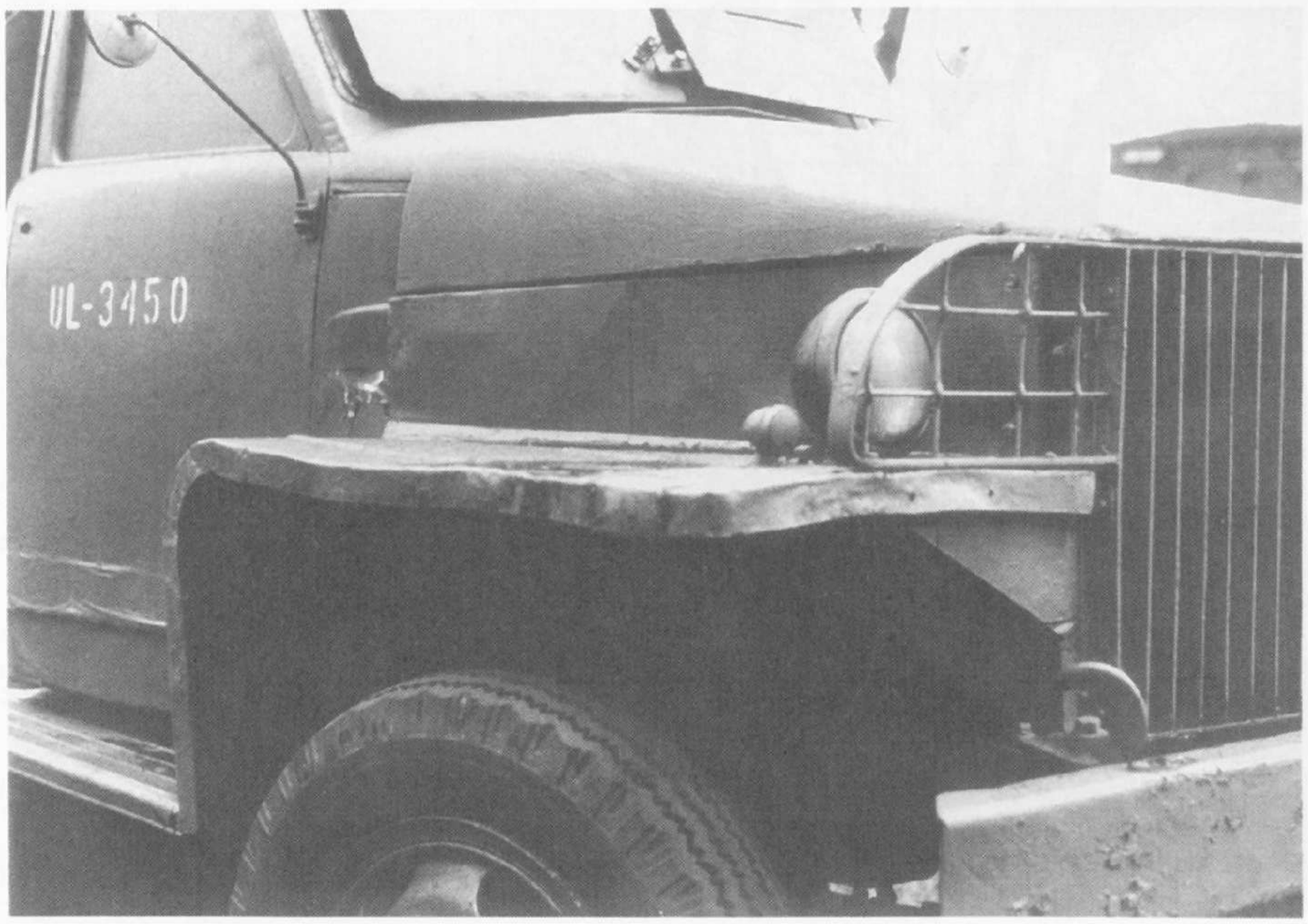
Below: Rear view of a BM-13-16 on Studebaker chassis. The remnants of white paint at the rear, as a replacement for taillights, are easy to see.



Left:
Front view of a Studebaker with BM-13-16 and lowered armor plates for the windshield.

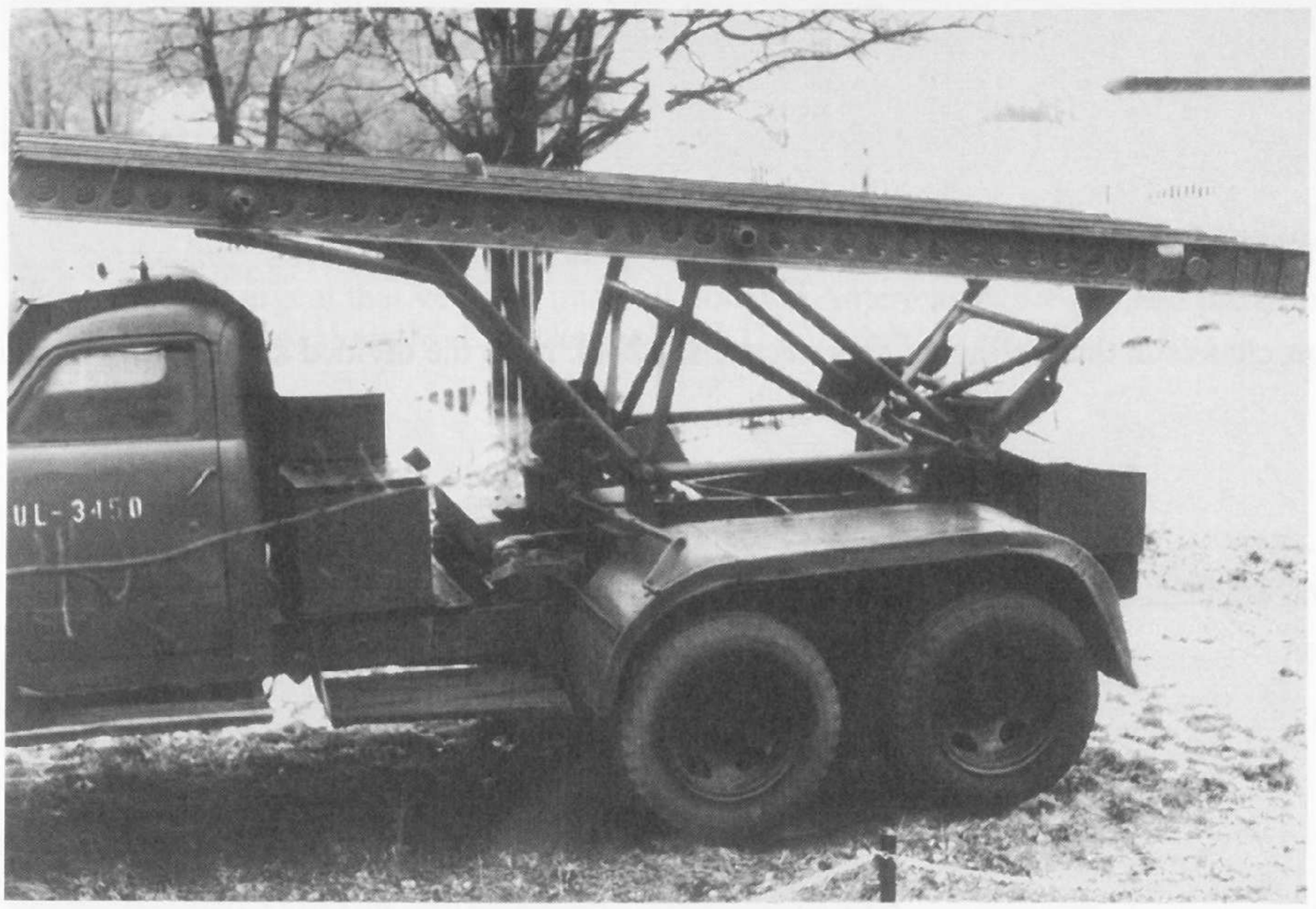


Right:
Rear view of the cab, with battery cases and racks for spare tires on the armor plate of the cab.

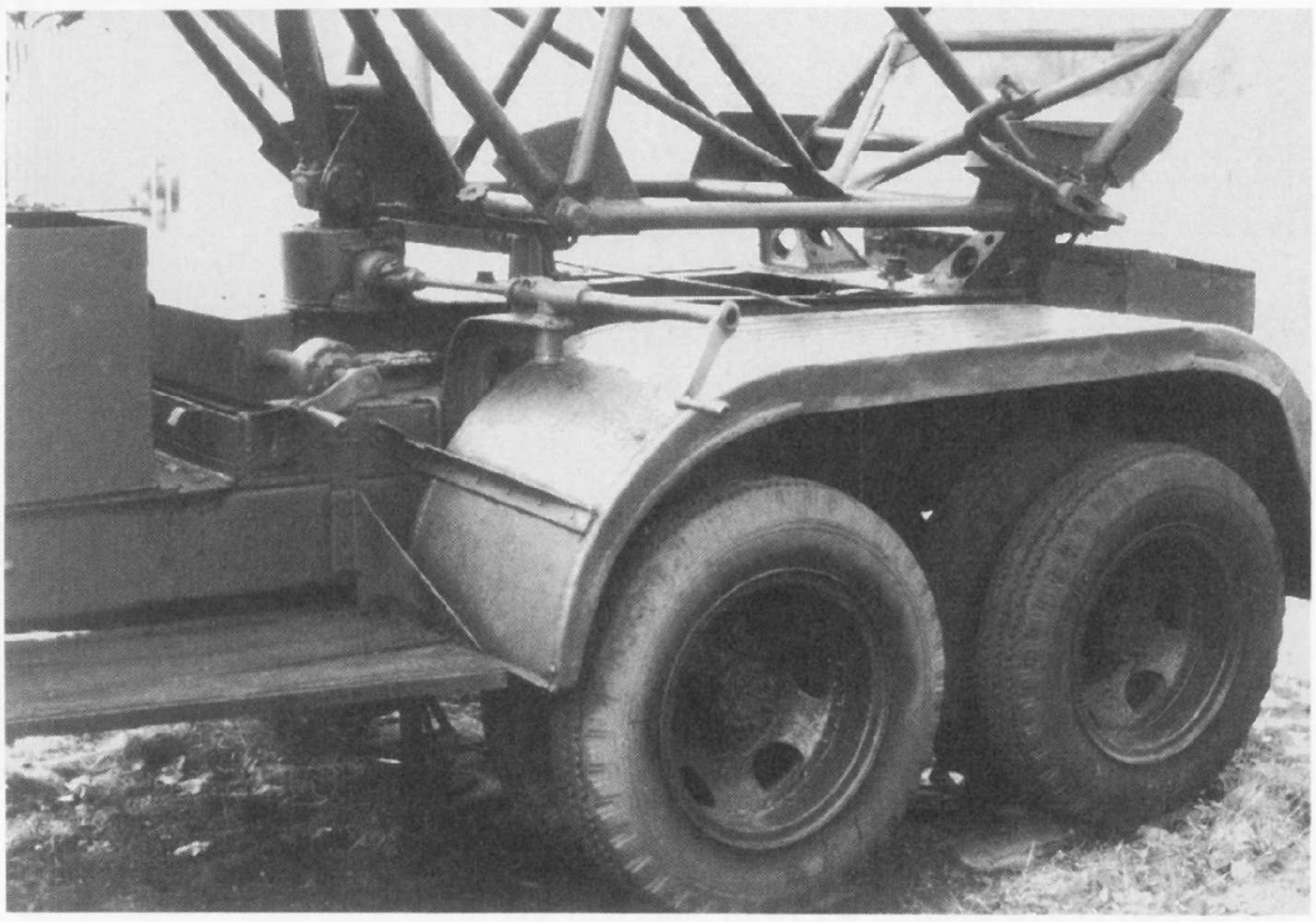


Left:
Fender, headlight and headlight grid of a BM-13-16 on Studebaker chassis.

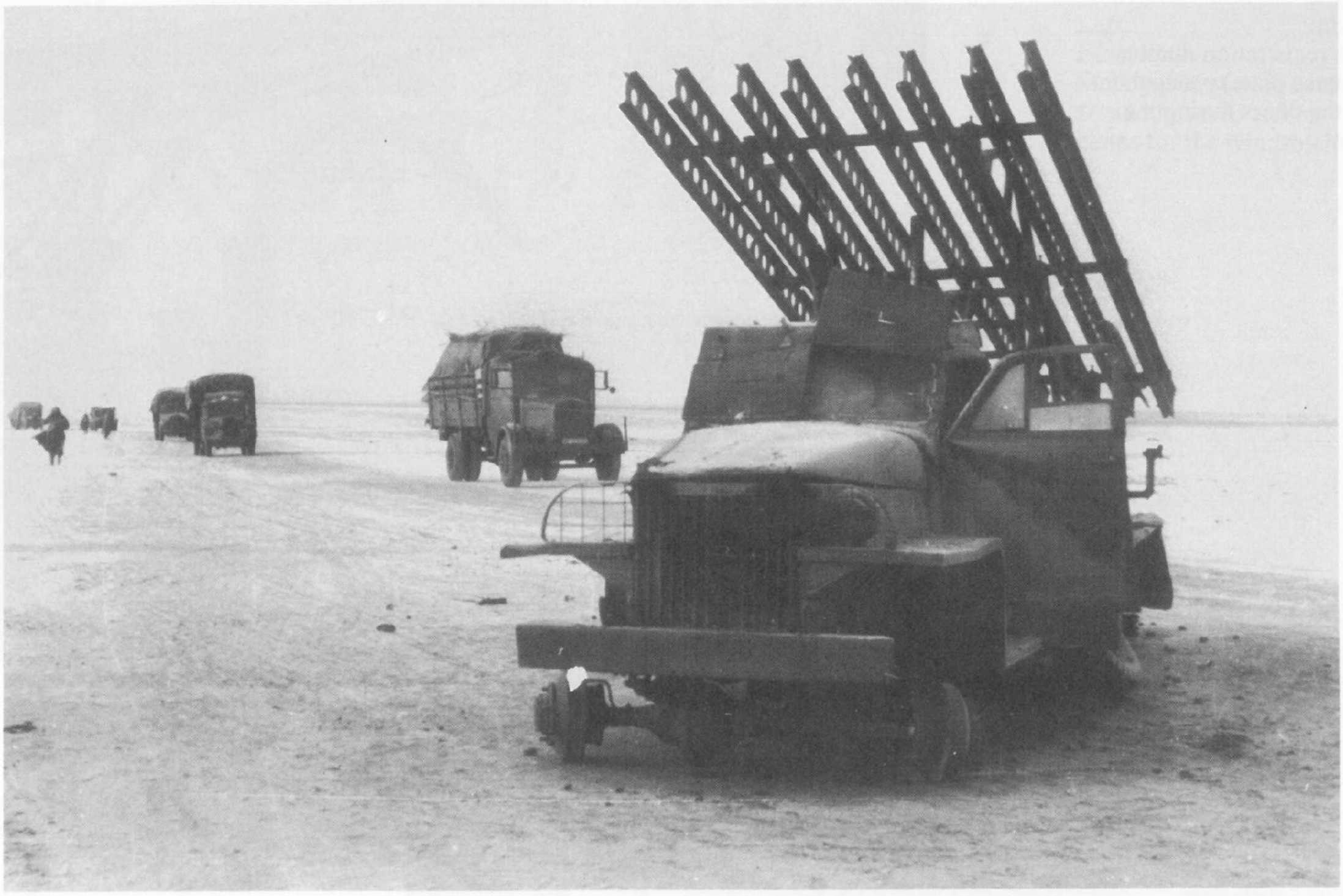
Right:
The registration number (license plate) was painted on the doors during the war.



Left:
The framework of the launcher frame of the BM-13-16.

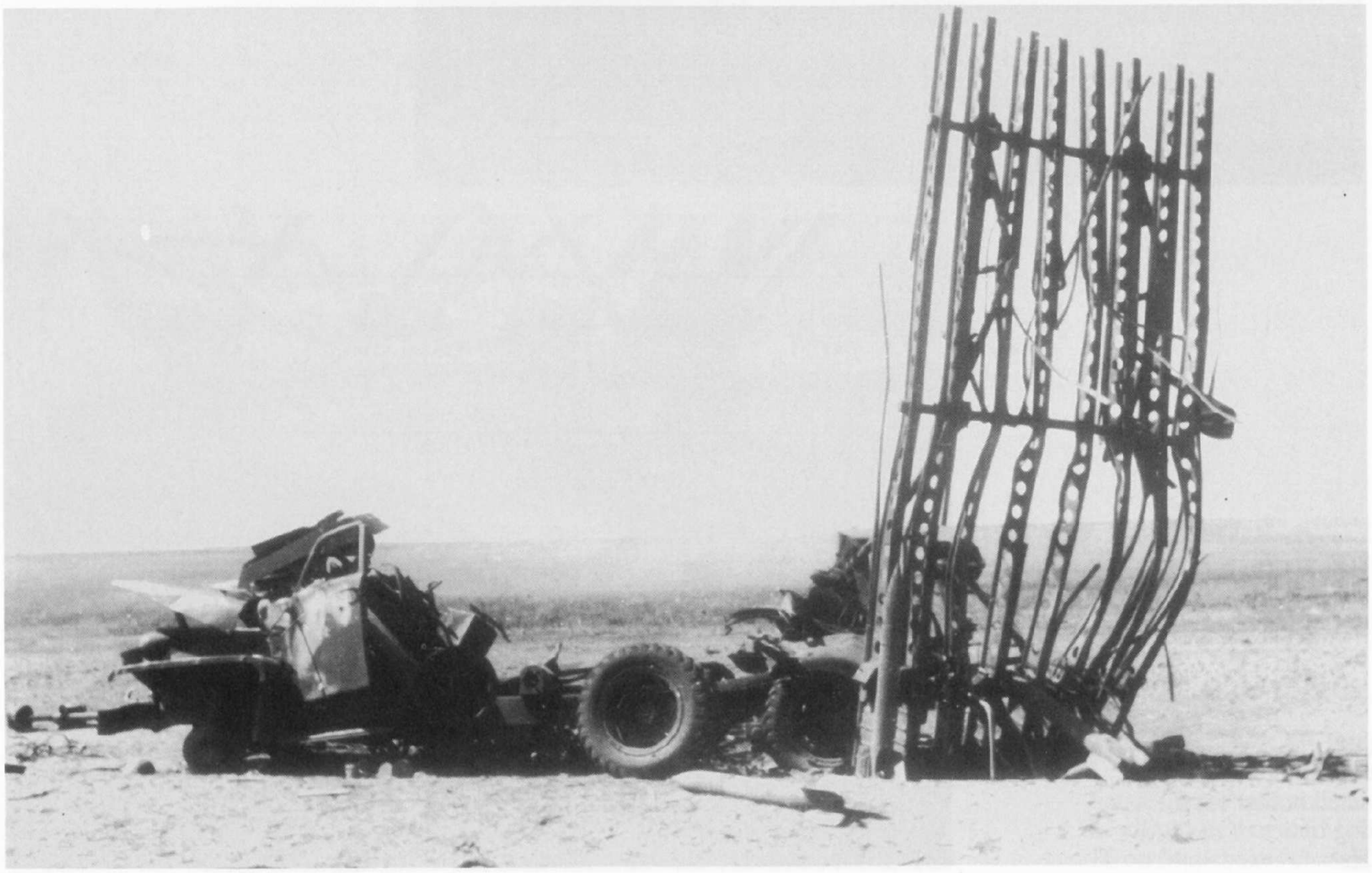


Right:
The elevation crank and retracted holder for the aiming optics of the BM-13-16.

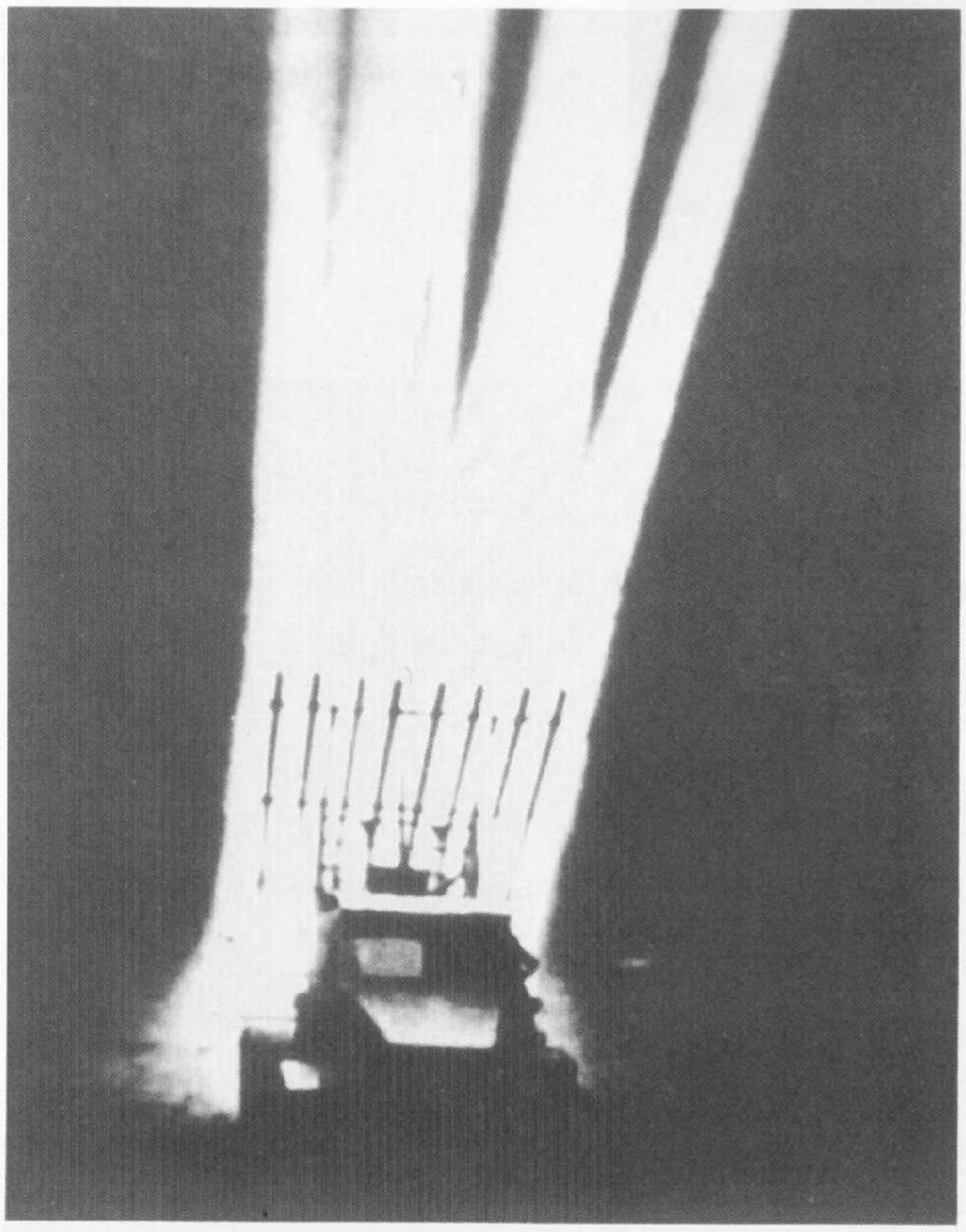


A destroyed BM-13-16 on Studebaker chassis in the Stalingrad area, winter 1942-43. Note the divided armor plates for the windshield. (BAK)

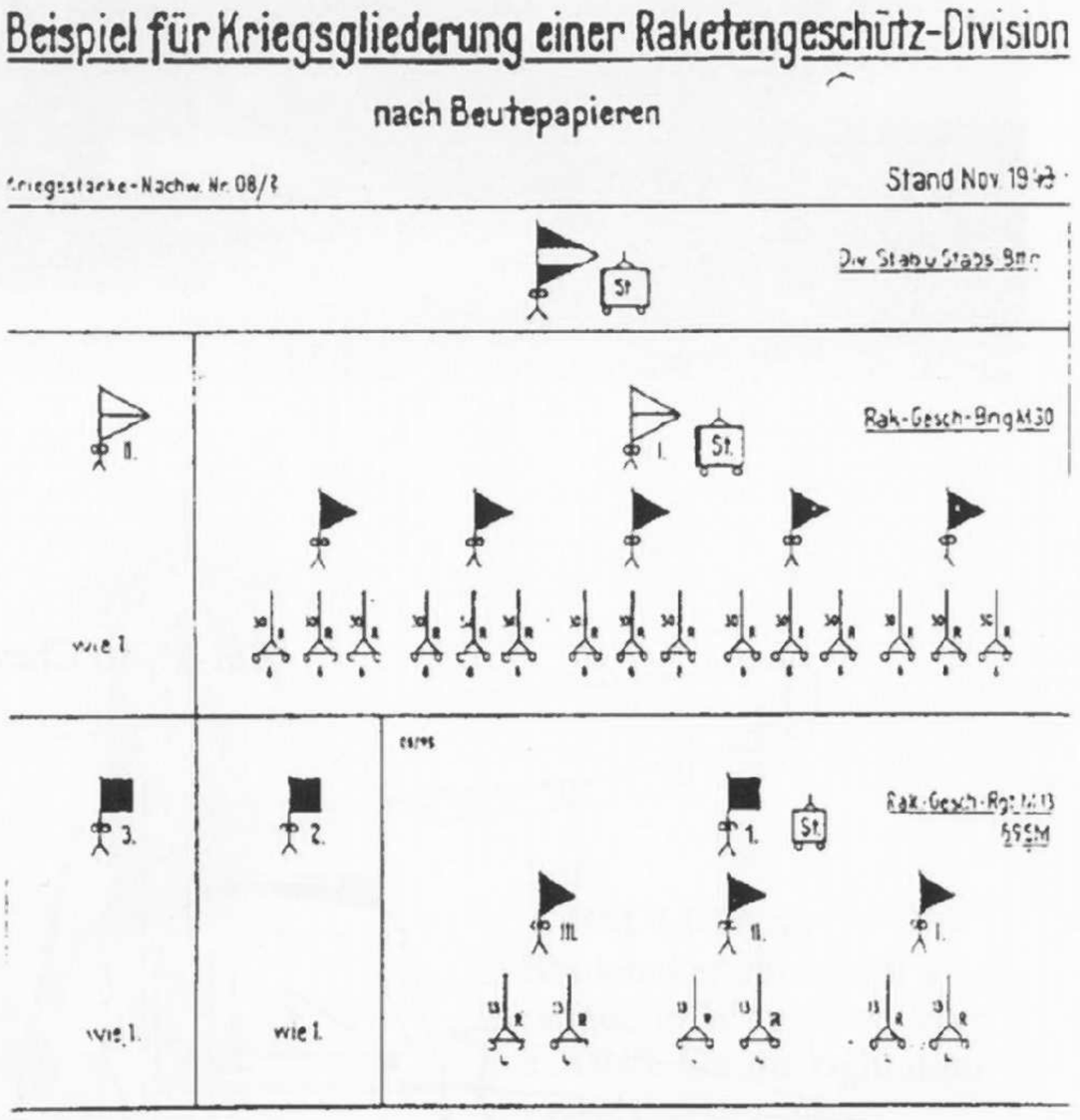
Below: A thoroughly destroyed BM-13-16 on Studebaker chassis in the southern sector of the eastern front in 1943. The rim of the spare wheel can be seen behind the cab. (BAK)



Southern sector, eastern front, 1943. A destroyed Stalin organ on Studebaker chassis. The use of the American truck chassis was so urgent that vehicles that still bore the American name reached the front (note the name on the radiator grille). Note the overlong M-13 rockets, the M-13-DD version. (BAK)



A BM-13-16 Studebaker firing a salvo during the night.

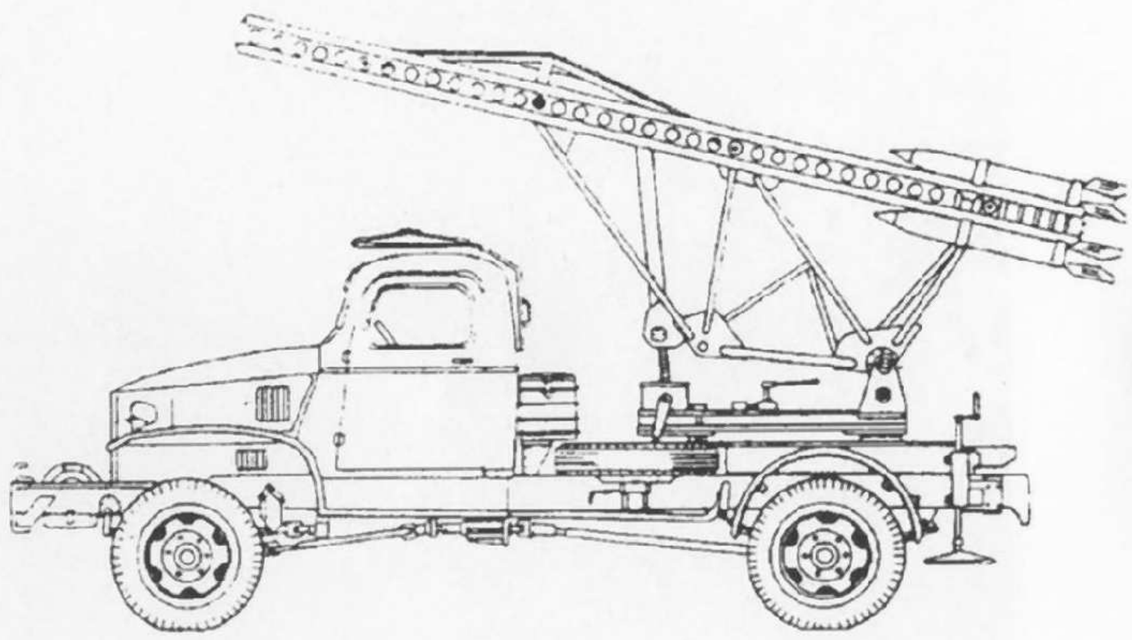


The organization used by the FHO (Foreign Armies East). This organization lasted only five to ten days. The first chief of rocket artillery was Lt.Gen. of the Artillery V.V. Aborenkov.

shal Zhukov had assembled the highest concentration of salvo launchers before his attack on Berlin in April of 1945: 1620 BM-8, BM-13, BM-31-12 and 1785 launching apparatus with the M-30 were at his disposal. In all, 219 "Katyusha" units went onto the battlefield, divided among 44 rocket launcher regiments (82 mm and 32 mm) and 24 brigades (300 mm).

From July 1, 1941 to July 1, 1945, a total of 12,197 "Stalin Organs" were built. In 1942 the Red Army had 3237 rocket launchers of all calibers; in July 1943 there were 2200 salvo launchers at the front, and at the beginning of 1945 there were 2993.

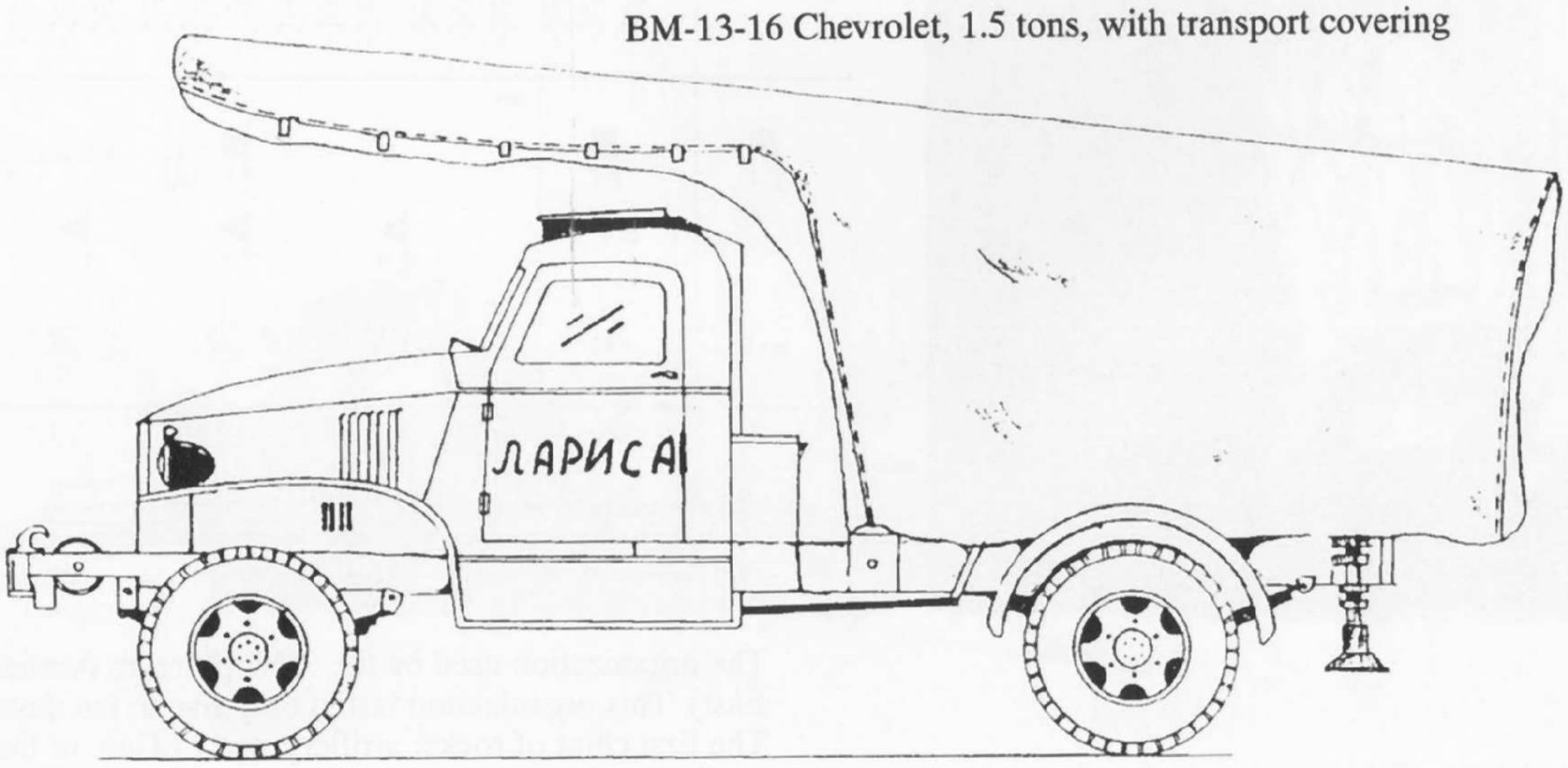
After 1945 the Soviets developed the "Katyusha"further. They produced the BM-14, BM-24, BMD-20 and BM-21, as well as other variants. The targeting precision was heightened, the salvo cadence was lowered, and a filter and ventilation system for the gas development during firing of the rockets, intended to protect the crews in the cab, was developed. The Katyusha BM-21, for example, was mounted on the Ural 375 D; it had forty rails, and the caliber of the rockets was 122 mm, their weight 66 kilograms, and the time required for a salvo was 20 seconds. The BM-21 could be made ready for action in two minutes. The vehicle's speed on the road was 75 kph.

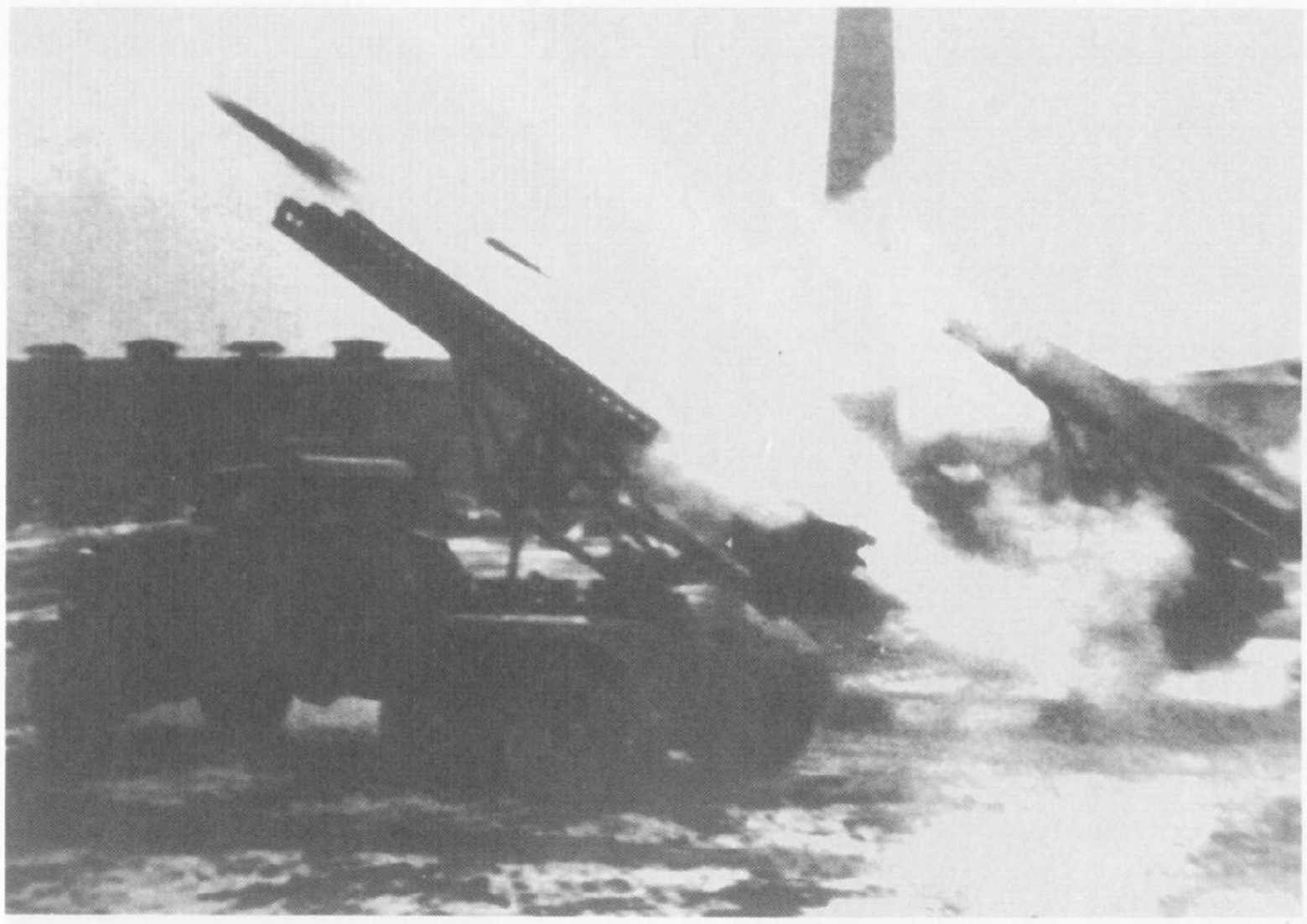


Right:
BM-13-16 on 1.5-ton Chevrolet

Left: Southern sector, eastern front, 1943. A BM-13-16 on GMC chassis (2.5 tons, short chassis) on the march to a new firing position.

BM-13-16 Chevrolet, 1.5 tons, with transport covering





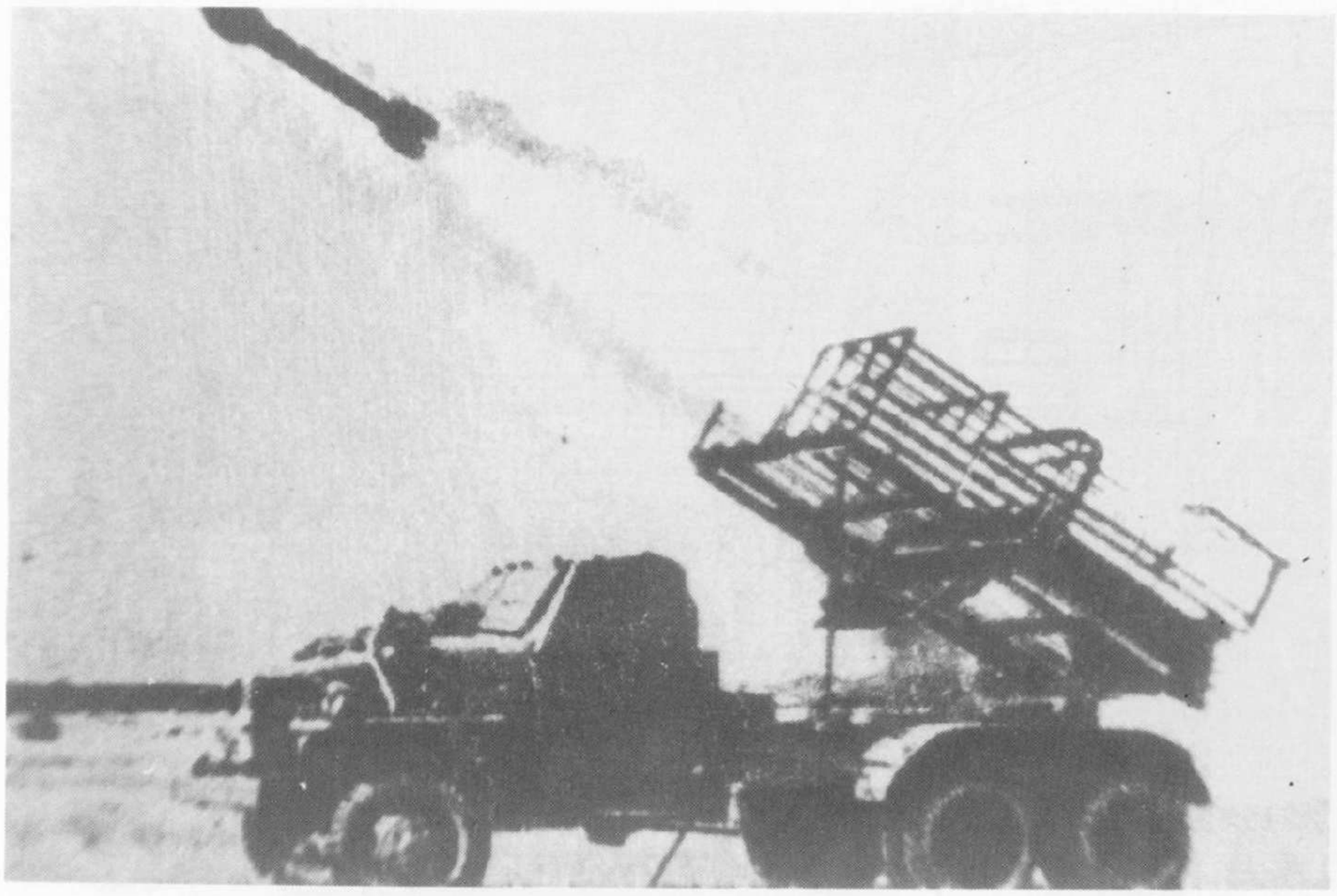
Left:
BM-13-16 on Studebaker chassis, firing a salvo in eastern Germany, 1945.

Right:
Southern sector, eastern front, 1943. A BM-13-16 on Studebaker chassis on the march to a firing position. For long distances, the launching rails were normally covered with canvas. Here too the ends of the bumpers are painted white, but not in squares. (MWP)

Left:
A BM-13-16 on Studebaker chassis in a parade in Warsaw on May 1, 1949. On the right door is the Polish eagle emblem, as well as the license number, and a tactical symbol is on the left windshield. The ends of the bumpers are painted white to be seen more easily at twilight and in the dark. (MWP)

Salvo fire in a night battle. (MWP)

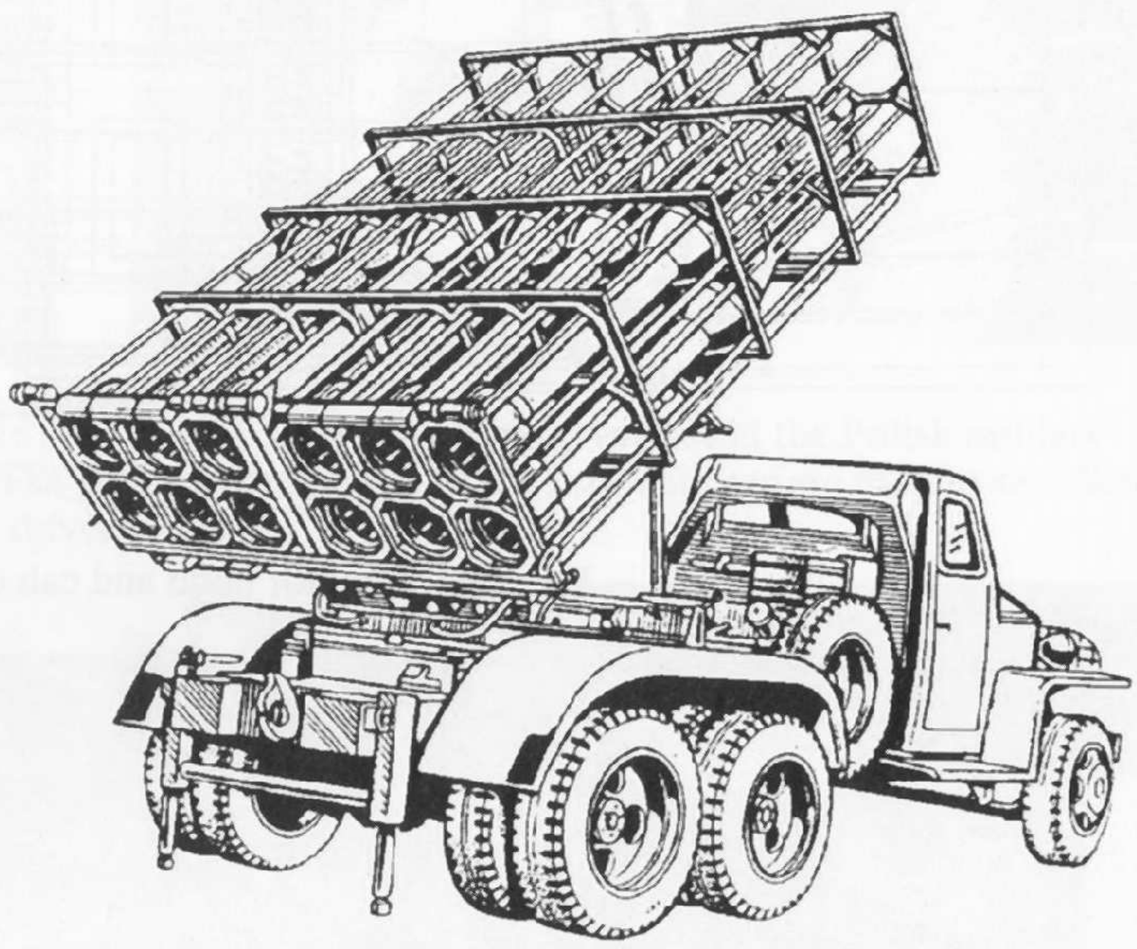
Below:
A Katyusha BM-31-12 in street battle on Glogowa Street in Posen, February 1945. This heavy launcher was in service at the front since 1944. On the plate is painted "for the fatherland." For better night vision, the sides of the front fenders are also painted white. In the background, the launching frames of three more BM-31-12 can be seen. (AMP)

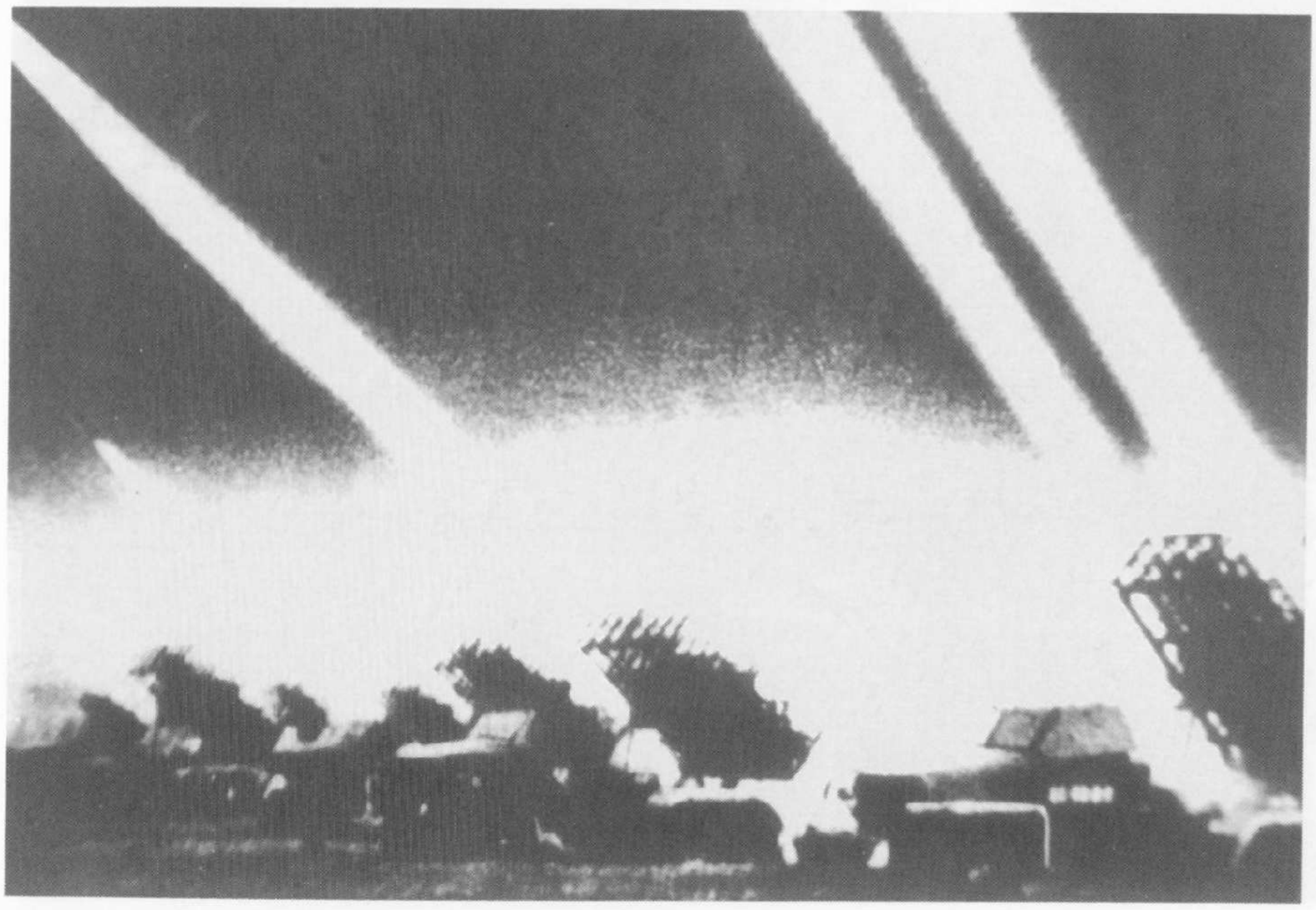


Left:
A BM-31-12 in the Küstrin area, April 1945.

Below:
BM-31-12 on Studebaker Chassis.

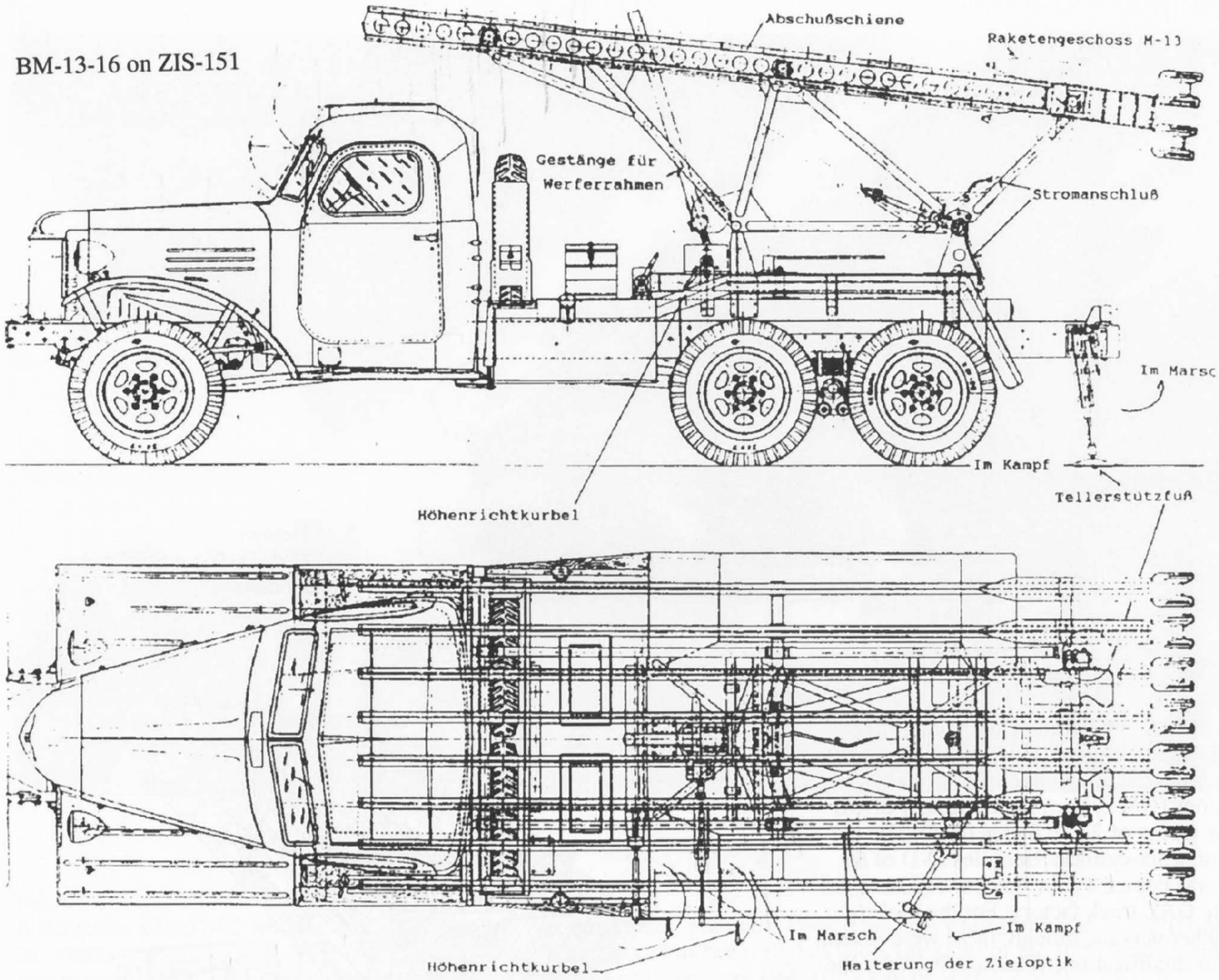
The official American designation of the Studebaker chassis was US6-U2. The three-axle Studebaker was one of four main versions (GMC, Reo, International) of US army trucks of 2.5 to 5 tons (6x6). The motor, a six-cylinder Hercules JXD of 87 HP, was copied by the Soviets and installed at the GAZ truck factory. For the rocket-launcher version, though, there were several minor modifications. The tank between the first and second axles on the driver's side was moved to the right rear of the cab. The US chassis, like the Russian versions, had starting cranks, but unlike the Russian versions, had rear-view mirrors.



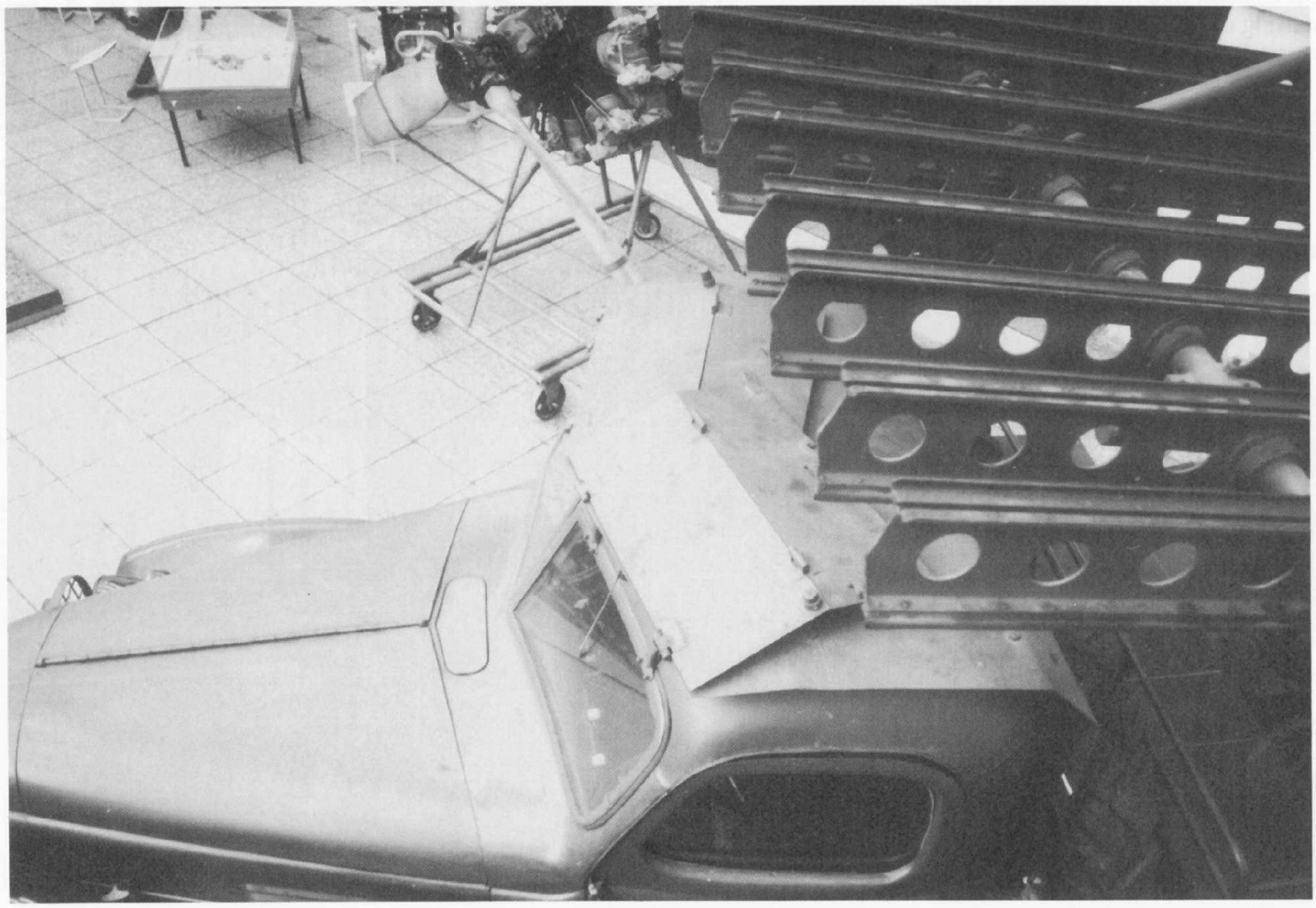


Left:
BM-31-12 on Studebaker chassis firing a salvo, 1944-45.

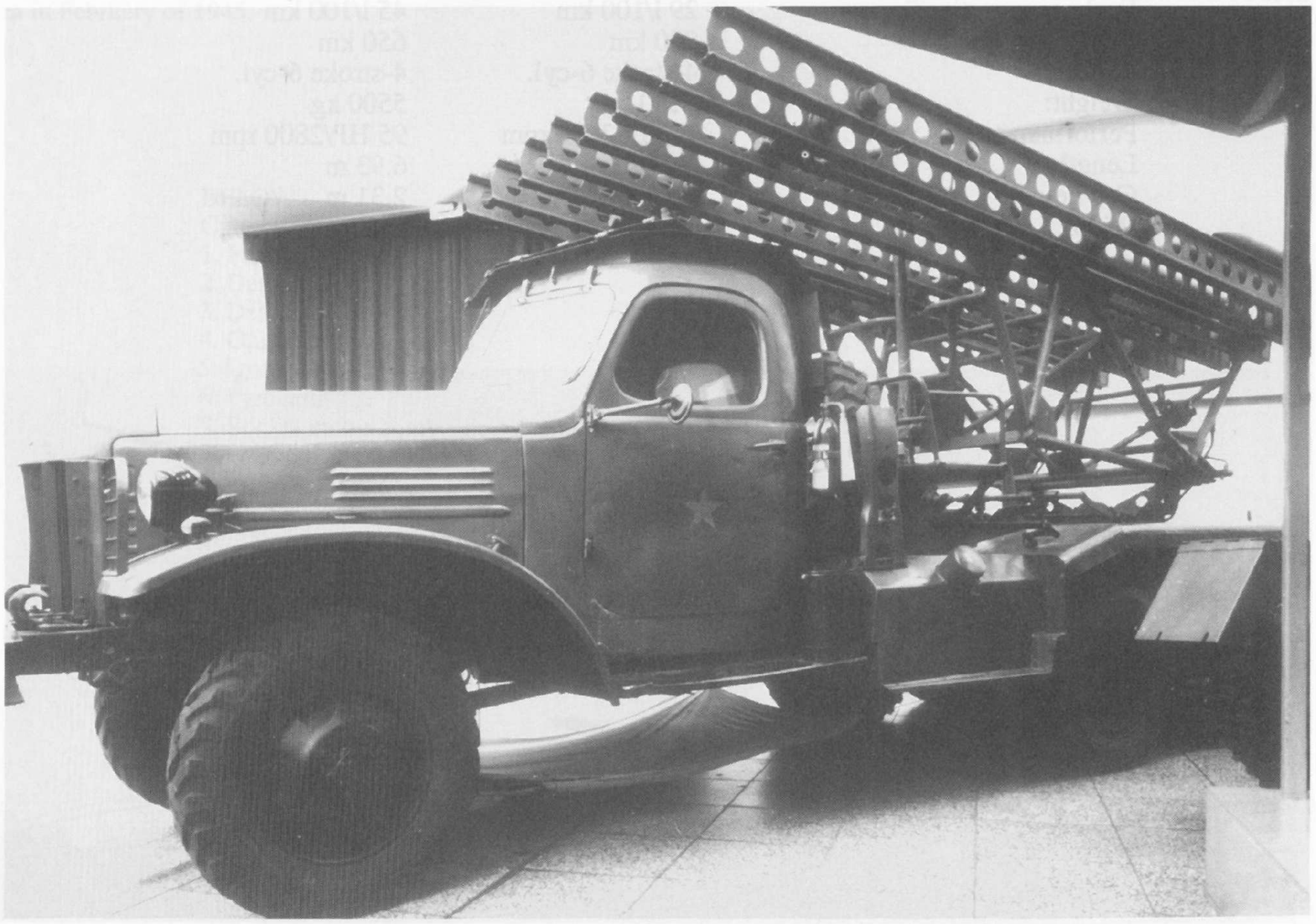
BM-13-16 on ZIS-151

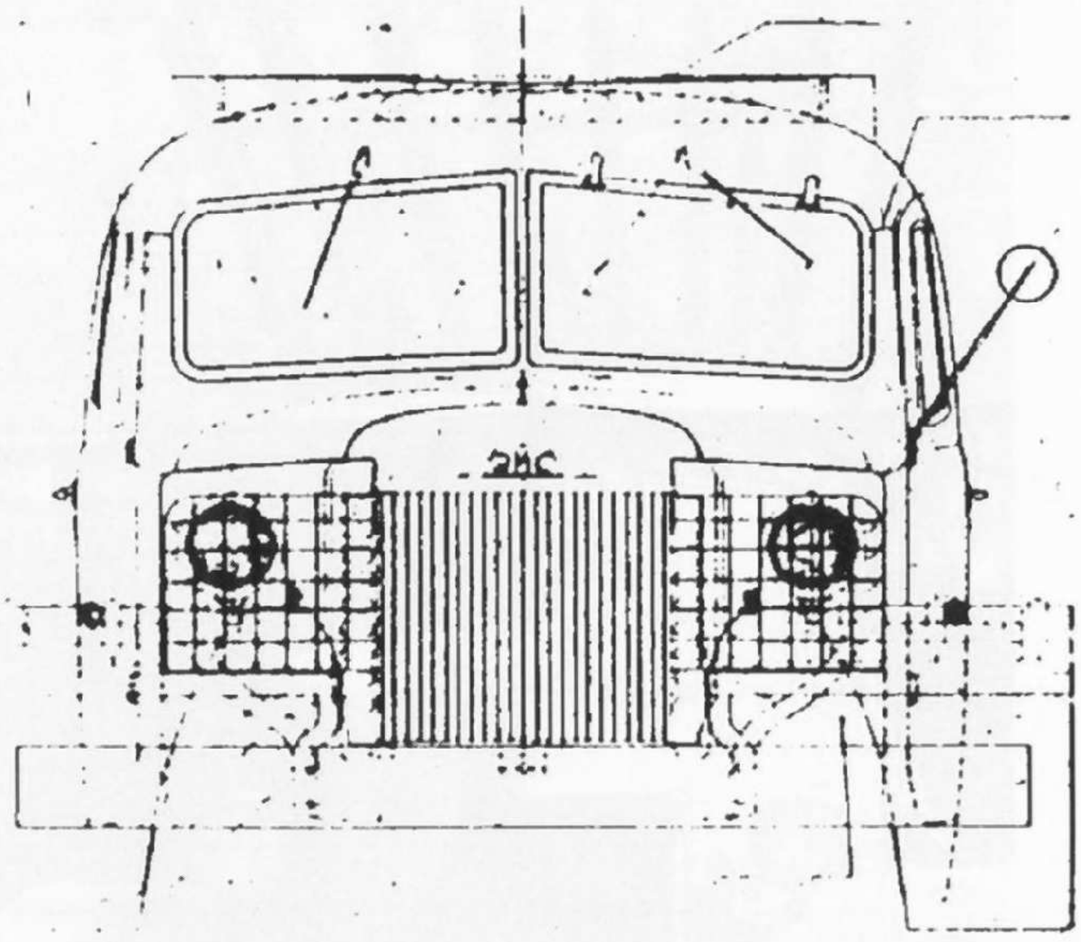


Below: The motor hood and cab of the ZIS-151 from above.



Above: The BM-13-16 on ZIS-151 chassis. This vehicle served until 1962 as a training vehicle at the Polish military academy. Note the finely ribbed radiator grille. Right: The tank and the profile of the original tires are easy to see. Below: BM-13-16 on ZIS-151 chassis; note the red star on the driver's door.



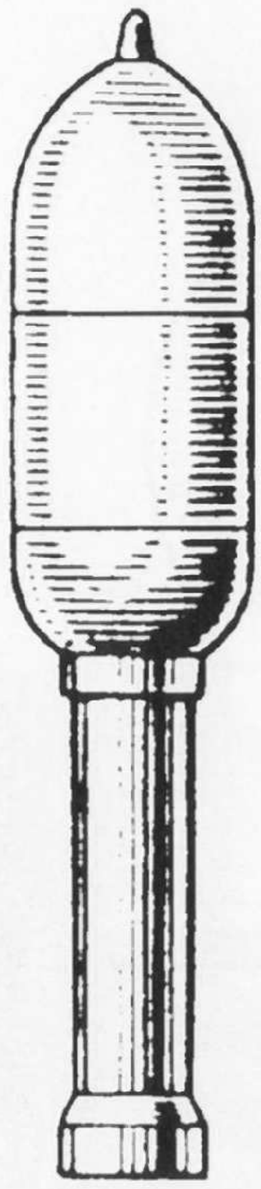


ZIS-151 frontview.

TECHNICAL DATA OF THE KATYUSHA CHASSIS:

	ZIS 5	ZIS 151
Top speed:	60 kph	65 kph
Fuel consumption:	29 l/100 km	45 l/100 km
Road range:	200 km	650 km
Motor:	4-stroke 6-cyl.	4-stroke 6-cyl.
Weight:	3100 kg	5500 kg
Performance:	77 HP/2400 rpm	95 HP/2800 rpm
Length:	6.6 m	6.93 m
Cab height:	2.16 m	2.31 m
Width:	2.235 m	2.32 m

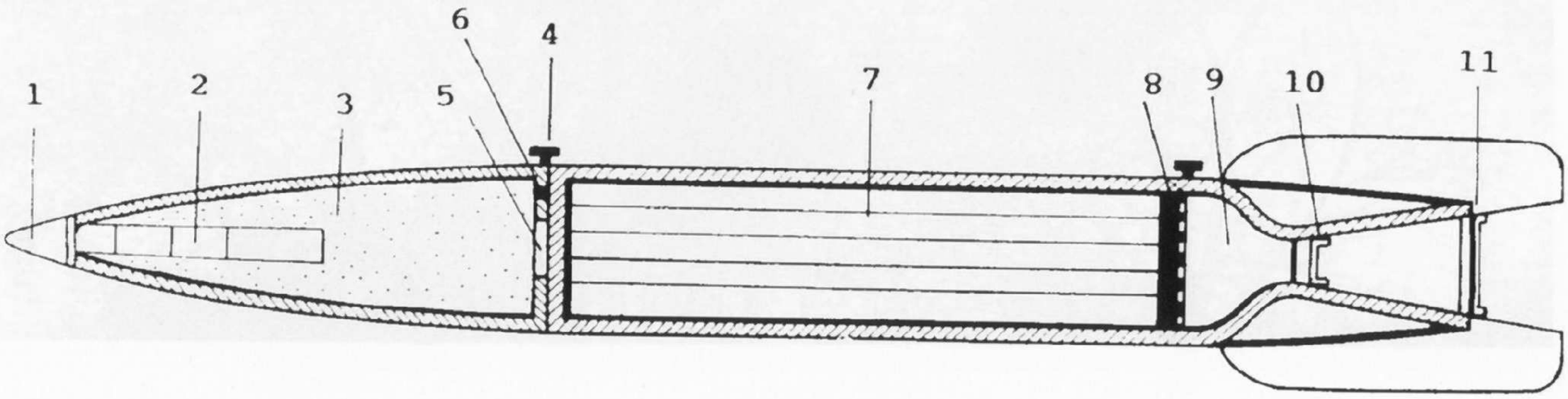
BM-13-16 on ZIS-151 firing on the eastern front, 1945.



M-28

The similarity to the German 28 cm launcher grenade cannot be missed. These are fragments of an M-28 fired in the Posen area in February of 1945.

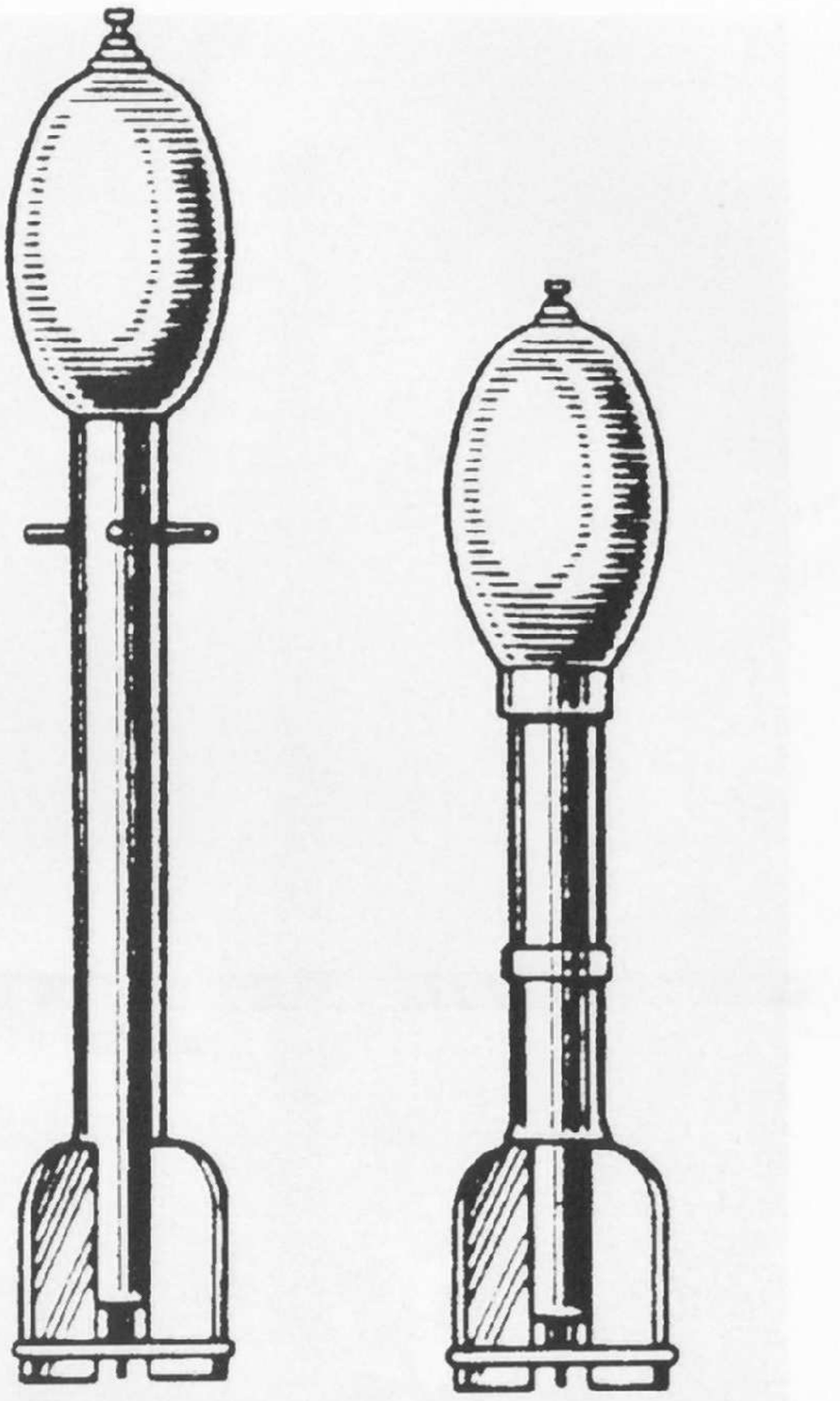
BELOW
Cutaway side view of an M-13 rocket:
1. Fuse
2. Detonator
3. Detonator charge
4. Guiding knob
5. Ignition
6. Pyrocartridge
7. Rocket motor combustion chamber
8. Combustion chamber grid
9. Exit ducts
10. Pressure lock
11. Duct exit lock (removed before ignition)



Heavy fire on the Karelian front, Vyborg area, 1943. (MHMD)

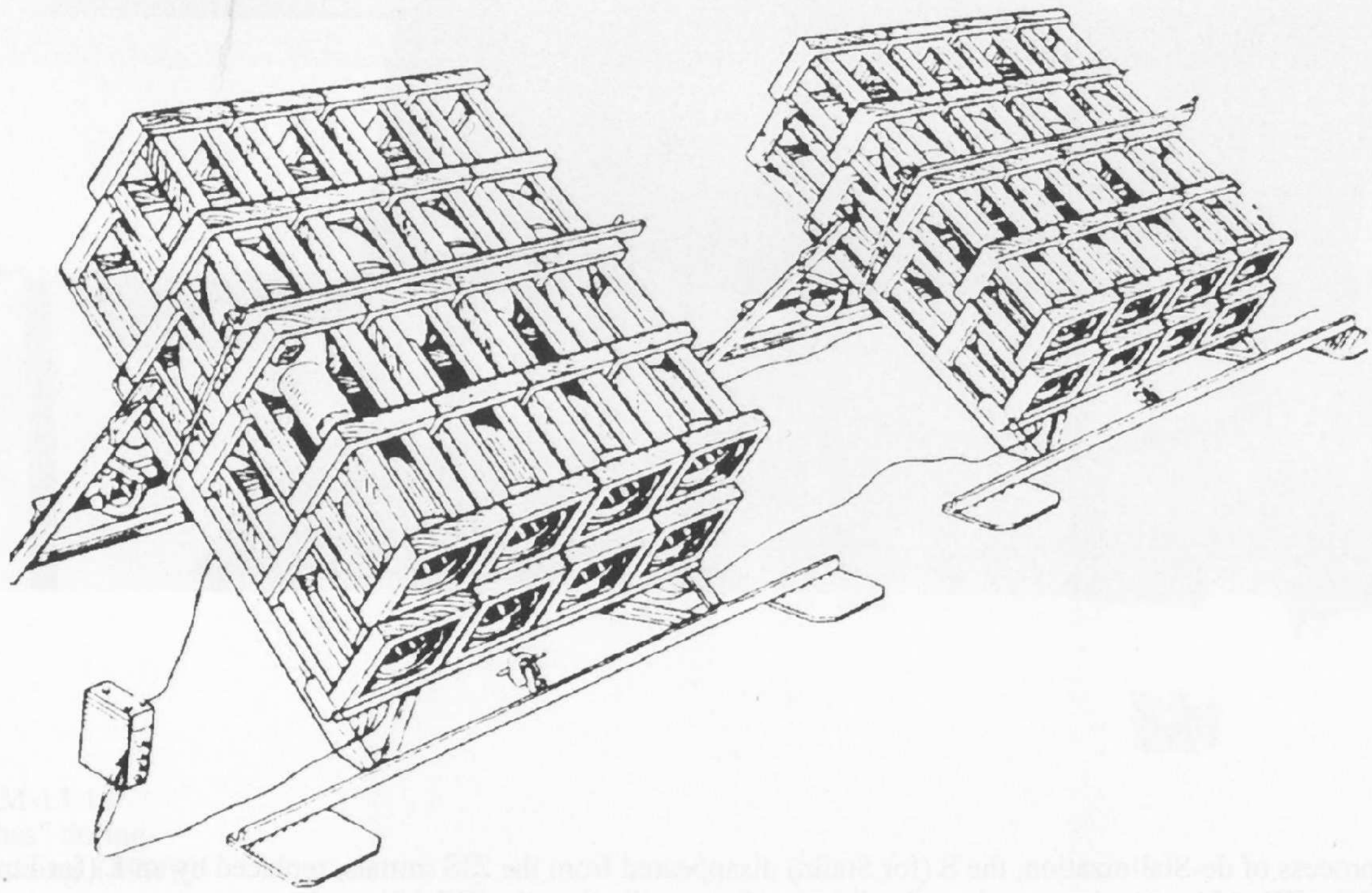
Below: Launchers for M-31 rockets in the final combat around Budapest, 1945.

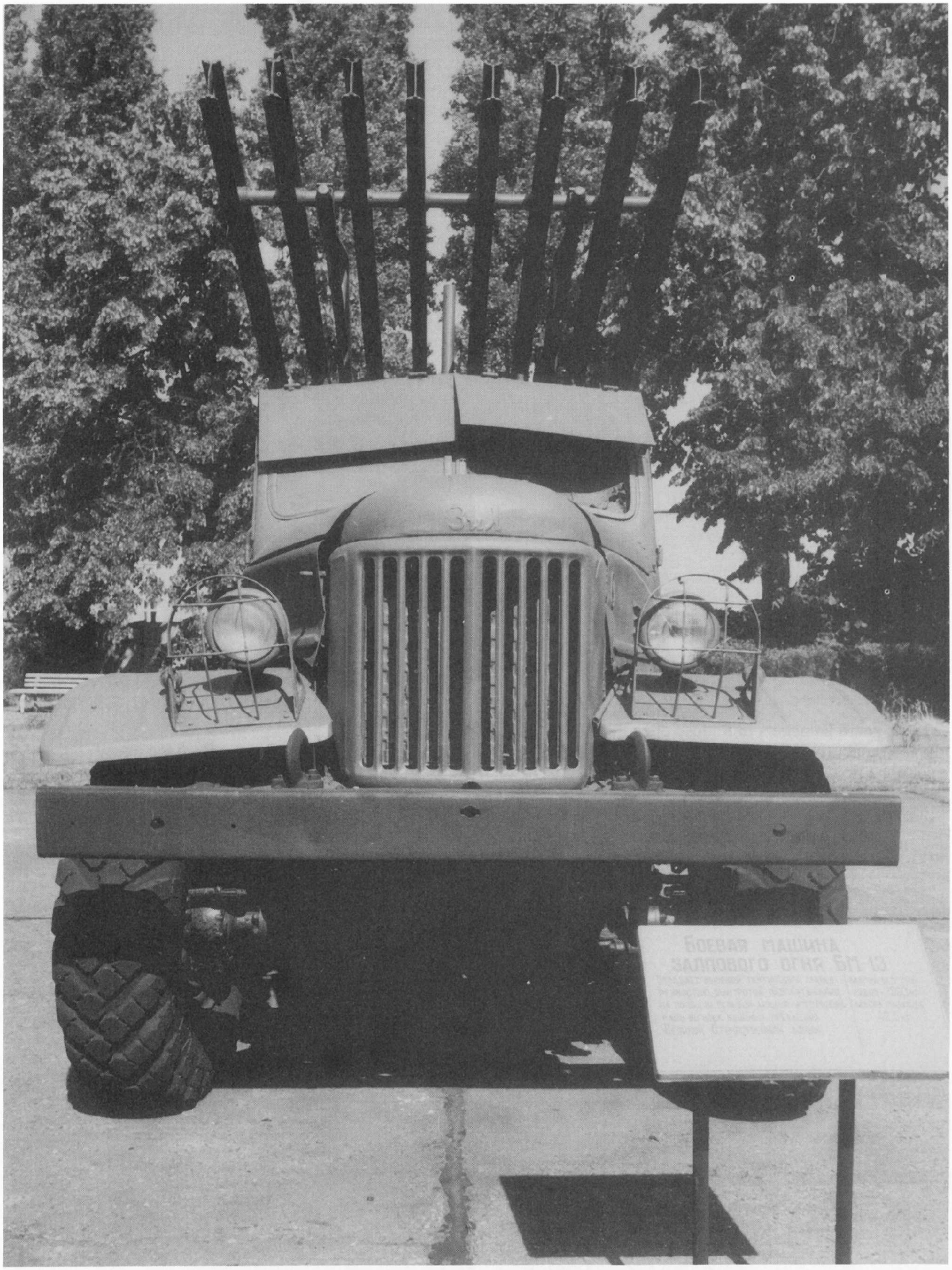
RS 31 guard launchers in Radosc open the attack on the Warsaw suburb of Praga on September 16, 1944. The rockets could be fired straight out of their shipping crates. In all, more than 10,000 launching devices for the M-31 were built. (MWP)



An M-31-UK rocket, with an M-30 rocket beside it; they were fired from the M-30 frame. The production of all calibers was 780,000 in 1941, 3,880,000 in 1942, 4,120,000 in 1943.

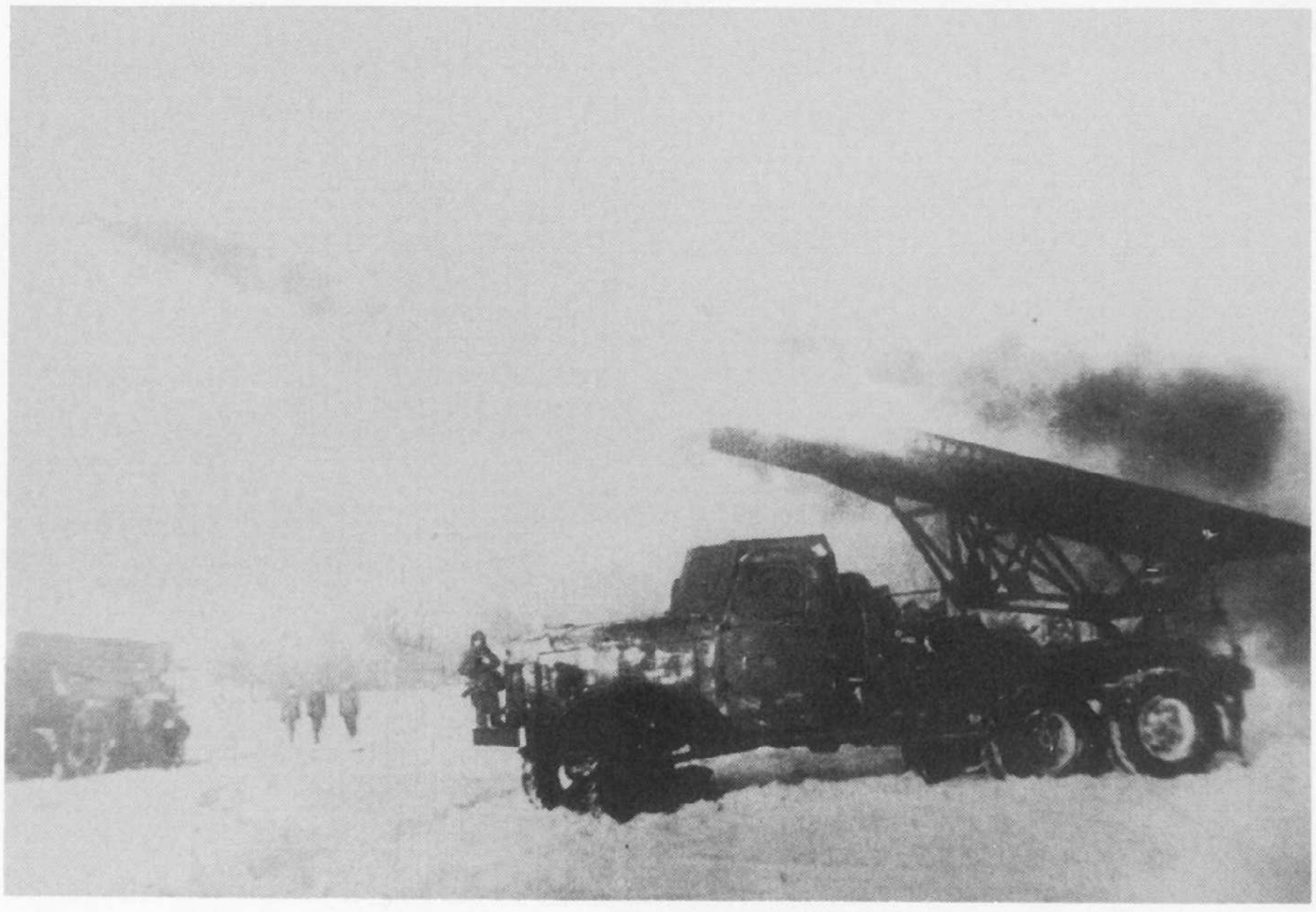
Below: M-30 launching frames.





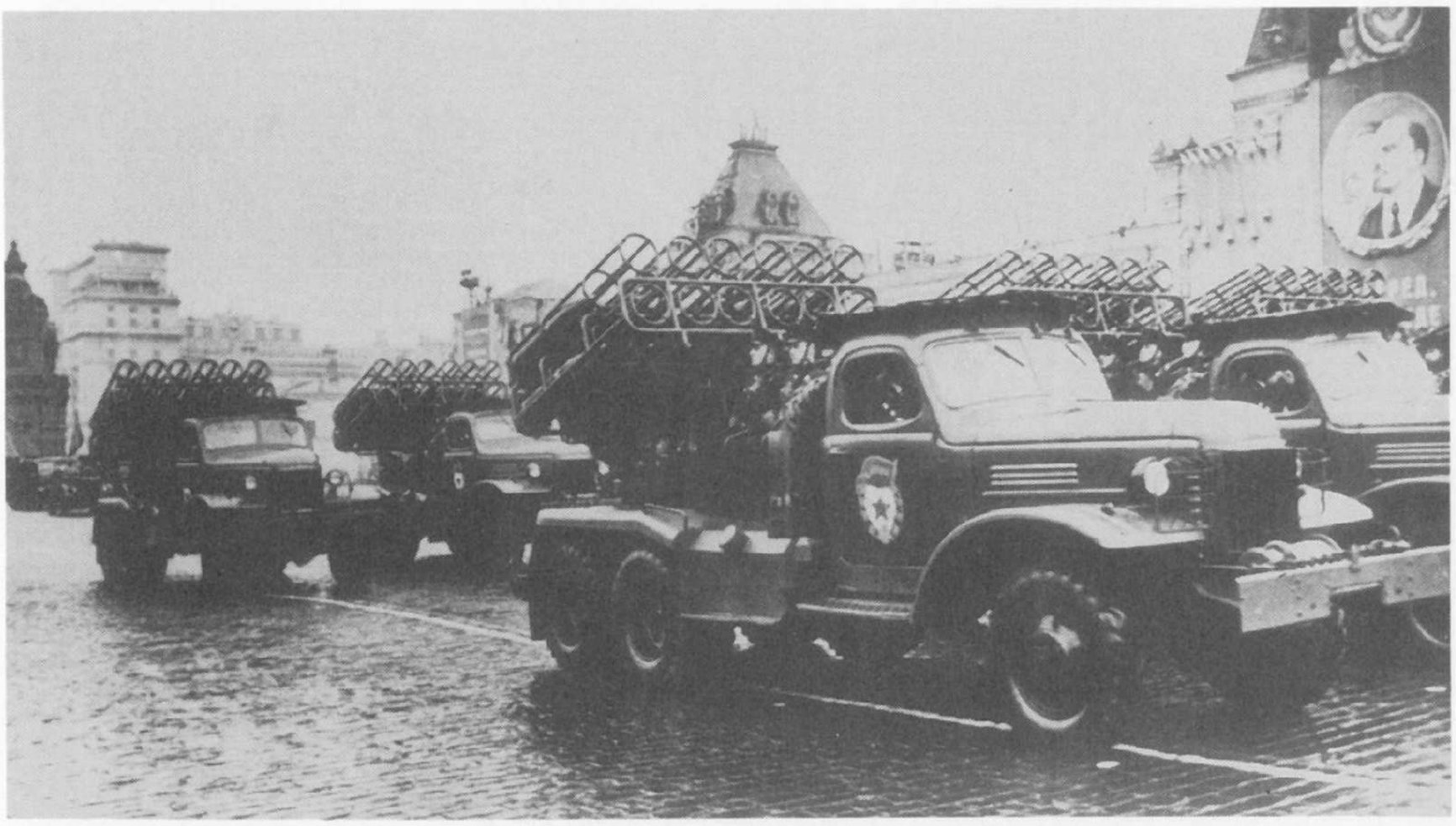
In the process of de-Stalinization, the S (for Stalin) disappeared from the ZIS initials, replaced by an L (for Lenin). Front view of the ZIL-151; note the more heavily ribbed radiator grille than the ZIS-151 predecessor.

Right:
A Katyusha BM-13-16 battery of the Polish Army in firing position. (MWP)

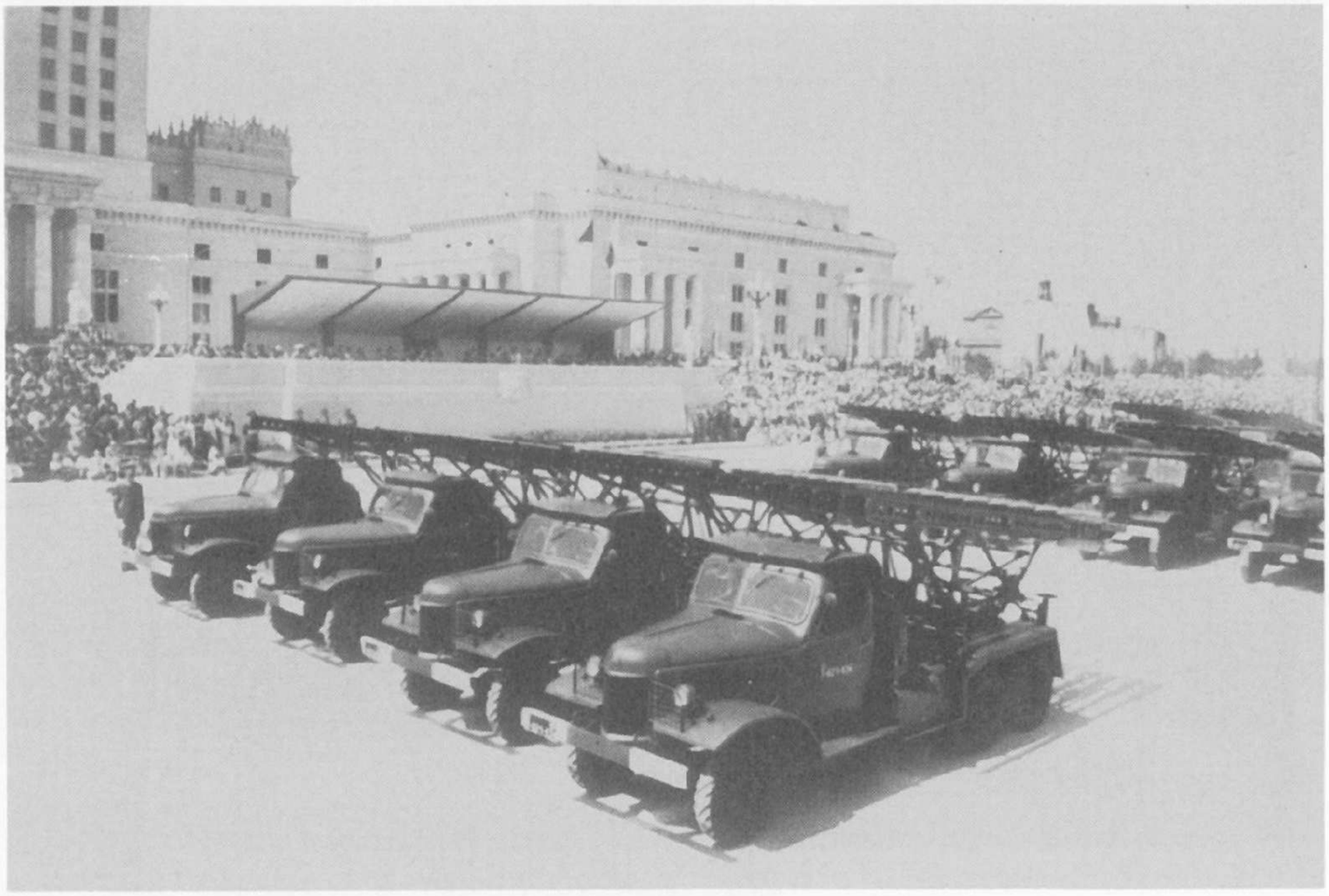


Left:
A Polish Army BM-13-16 on ZIL-151 chassis firing. To the left is a BM-21 with 40 launchers.

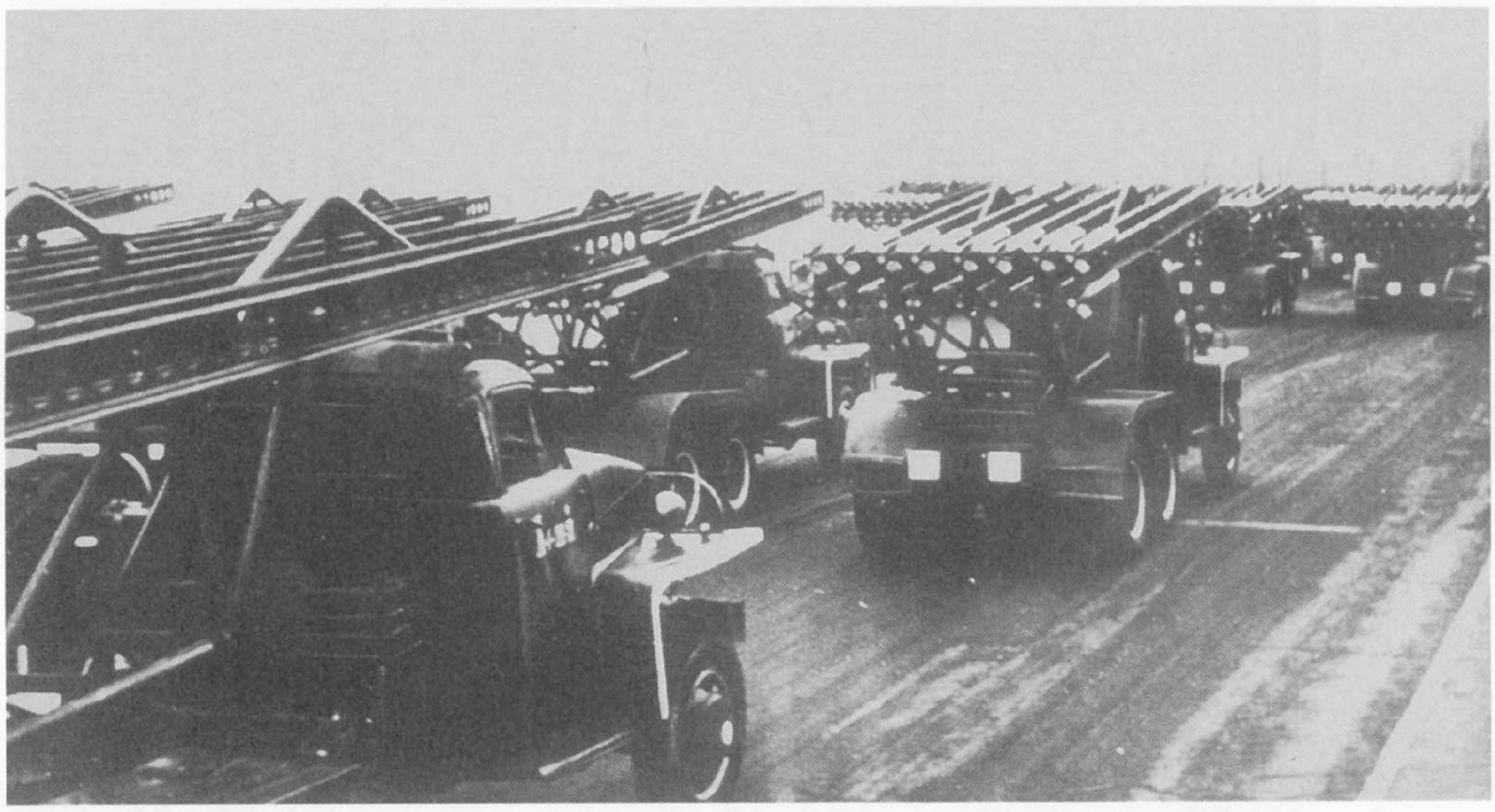
Right:
Polish BM-13-16 "Katyushas" during winter training. (MWP)



Left:
BM-24-12 on ZIL-151 chassis on parade in Red Square, May 1, 1955. This type of rocket launcher was first seen in a parade in 1953. It succeeded the BM-31-12. Note the guard launcher emblem on the first vehicle's door, and the winch with its cutout at the bottom of the bumper. (MWP)



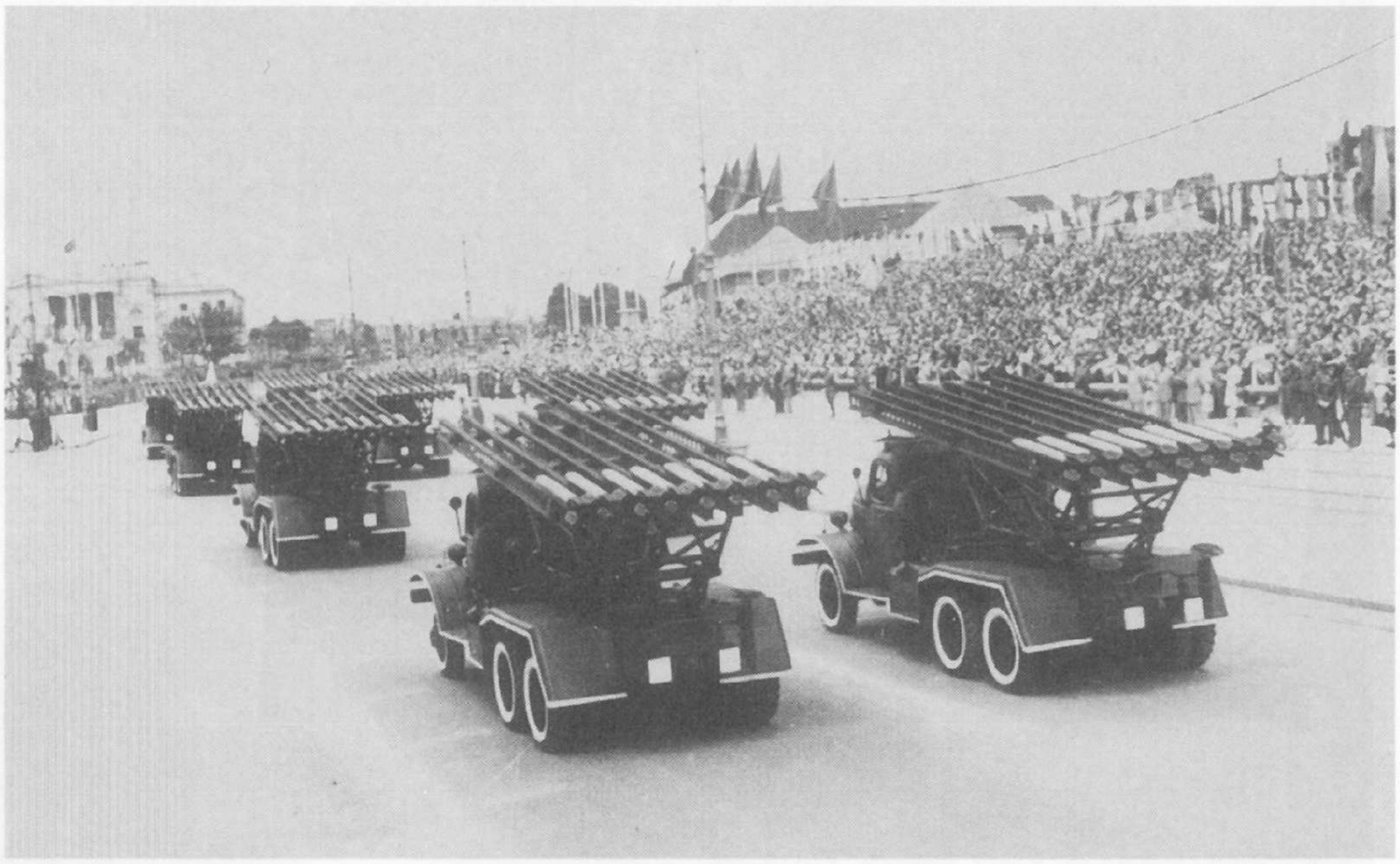
Right:
BM-13-16 on ZIL-151 chassis during a military parade before the Palace of Culture in Warsaw, July 22, 1951. The license plates are attached to the left sides of the bumpers. (MWP)



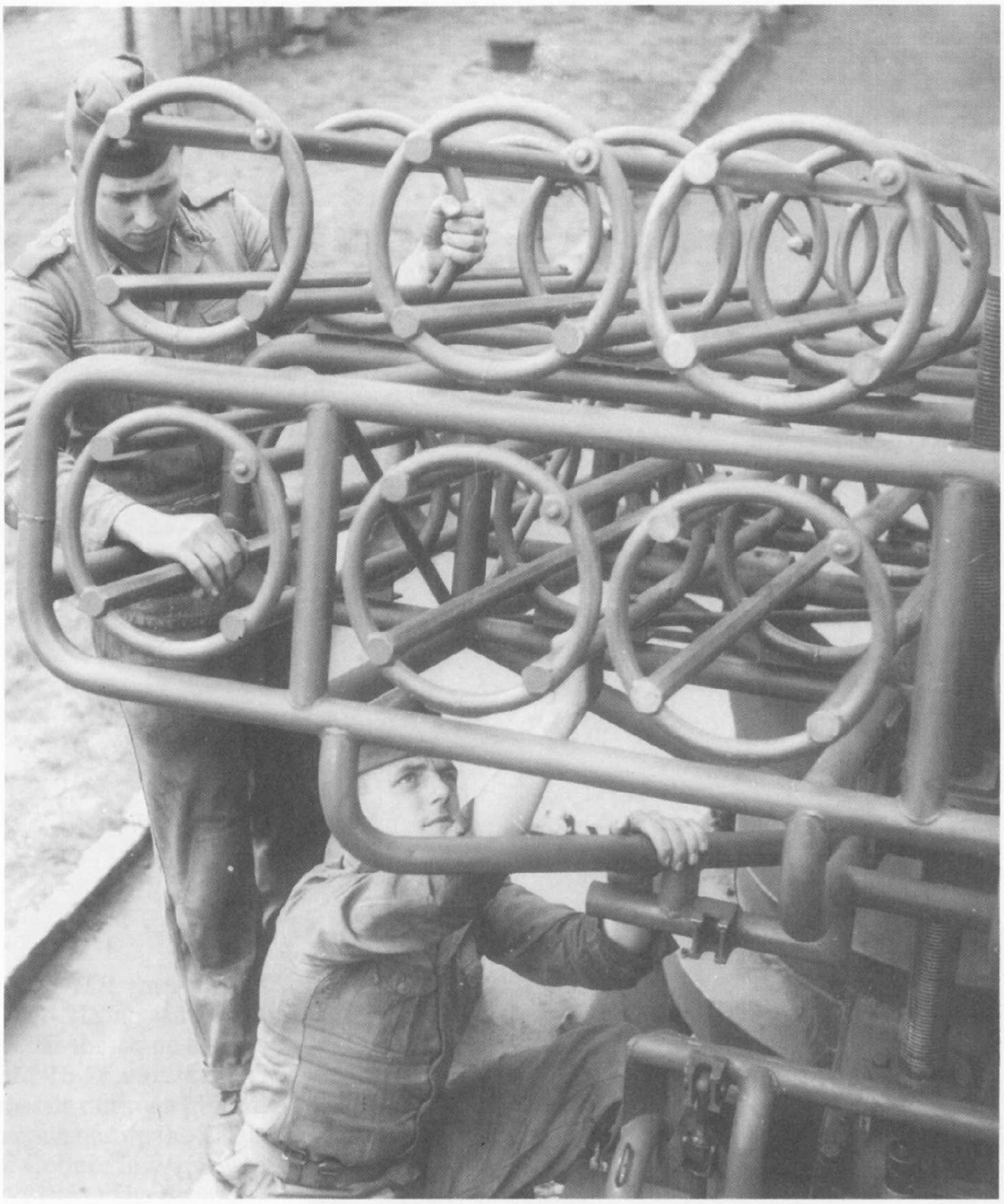
Left:
BM-13-16 on Studebaker chassis on parade, May 1, 1955. Note the frame braces projecting between the launching rails. (MWP)

Right:
BM-14-16 on ZIL-151 chassis on parade in Warsaw. The launcher units are mounted on round turning platforms. Note the seats for the crew and the tactical symbols. (MWP)

Left:
Polish Army BM-14-16 Katyushas on ZIL-151 chassis on parade in Poznan, July 22, 1952. (MWP)



Right:
Parade of BM-13-16 on ZIL-151 after the war, probably in Warsaw. For better sighting, the fenders were painted white, but the whitewall tires were used only for parades. (MWP)



Left:
A BM-24-12 of the NVA is prepared for a salvo. The crew improved the smoothness of the launchers by cleaning and oiling. (MHMD)

Below:
Loading a BM-24-12. (MHMD)

A Polish Army BM-13-16 on ZIS-151 is prepared for firing. (MWP) Right: The gunner of a Polish BM-13-16, late forties. (MWP) Below: The gunner of an NVA BM-24-12 in the sixties. (MHMD)

NVA gunners in the cab of a BM-24-12, with the launching controls on the passenger side. (MHMD)

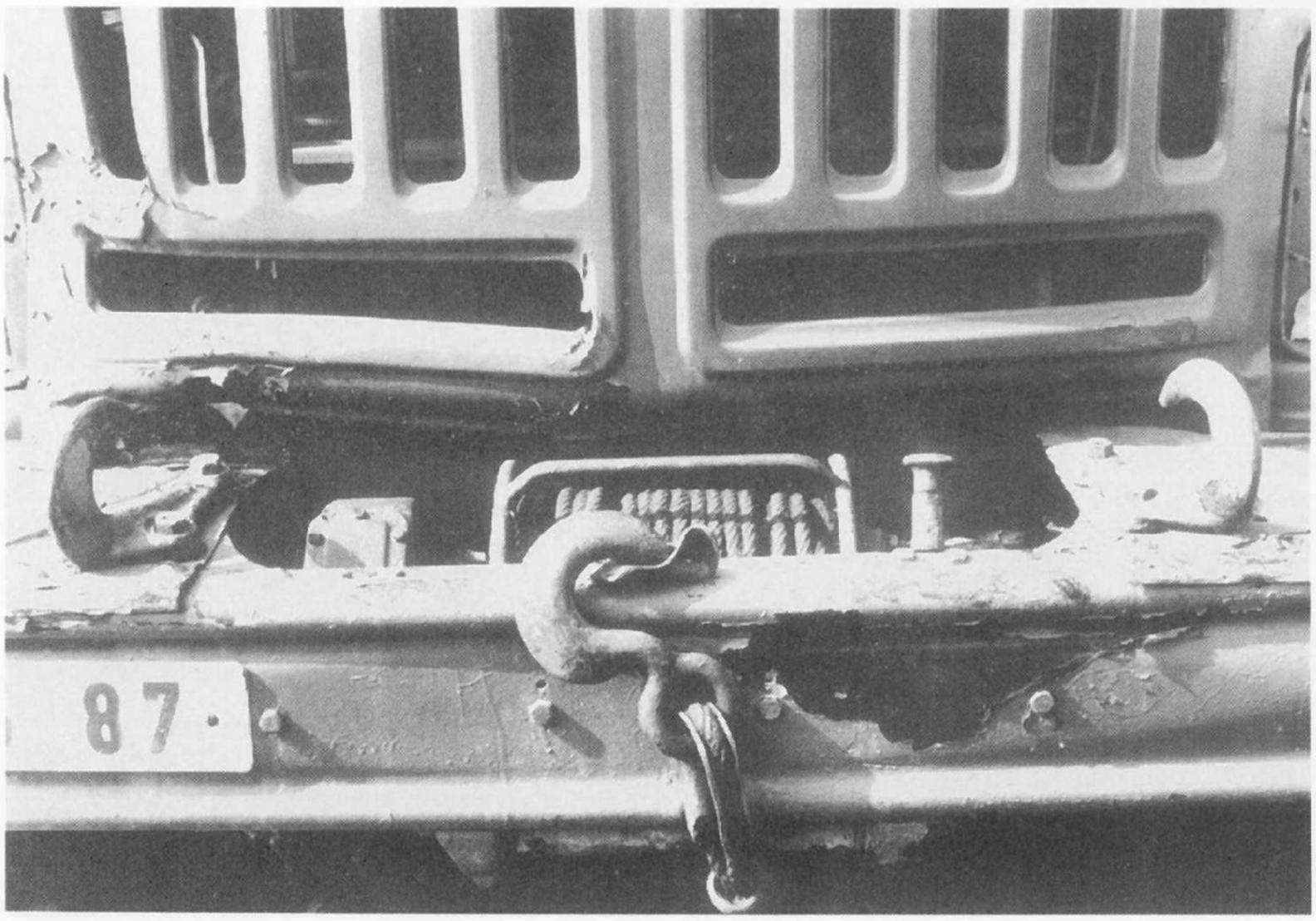
Below: NVA BM-24-12 in a night drill. (MHMD)

A BM-24-12 battery of the NVA in a firing drill. Note the emblems of the former East German forces on the doors. (MHMD)

Below:
NVA BM-24-12 battery in a firing drill. (MHMD)

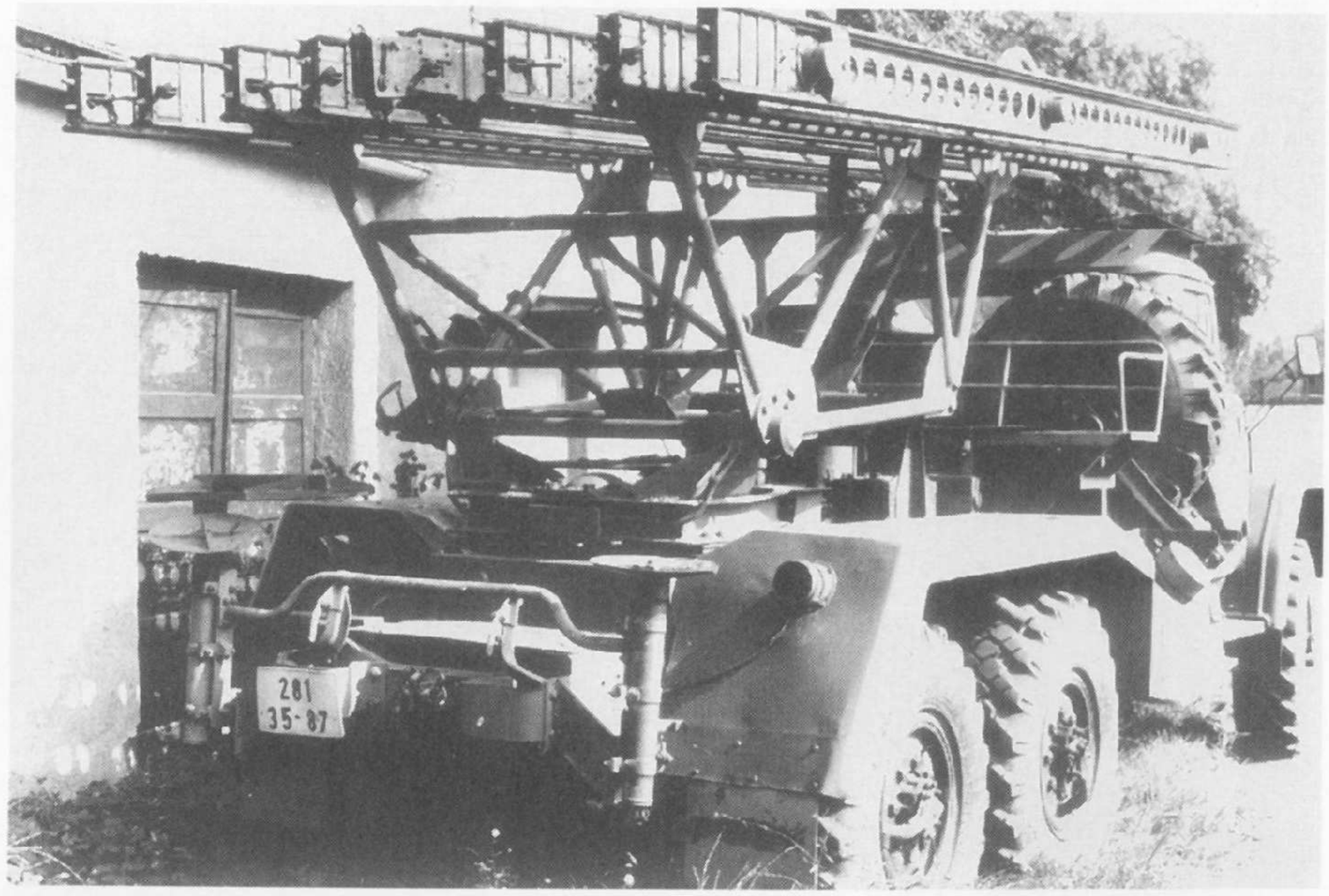
Left:
BM-13-16 on ZIL-131 of the former Czechoslovakian Army. This Katyusha is a blend of World War II launcher and modern ZIL series chassis.

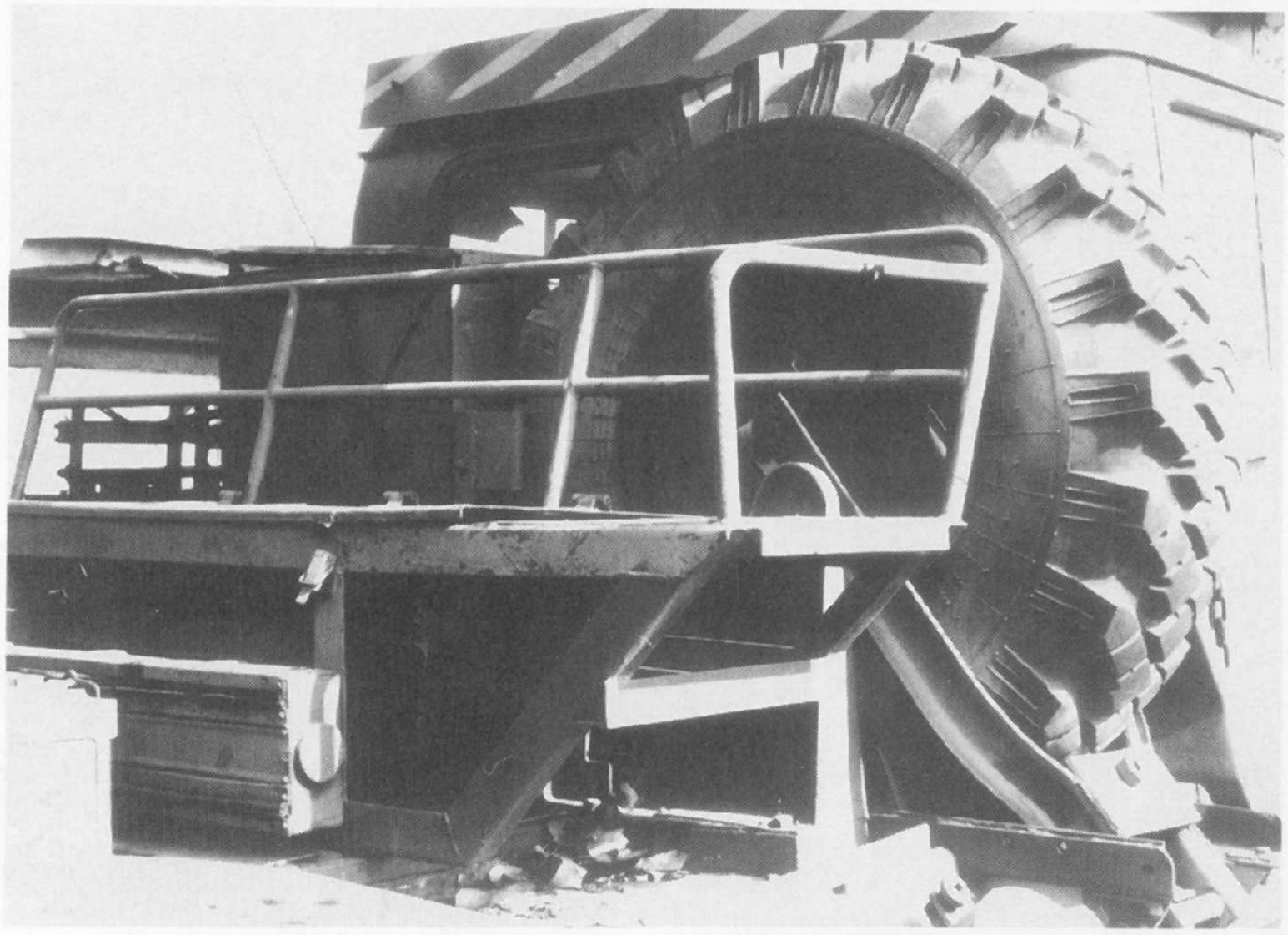
Right:
Note the regular license plate and the tire-pressure regulator.



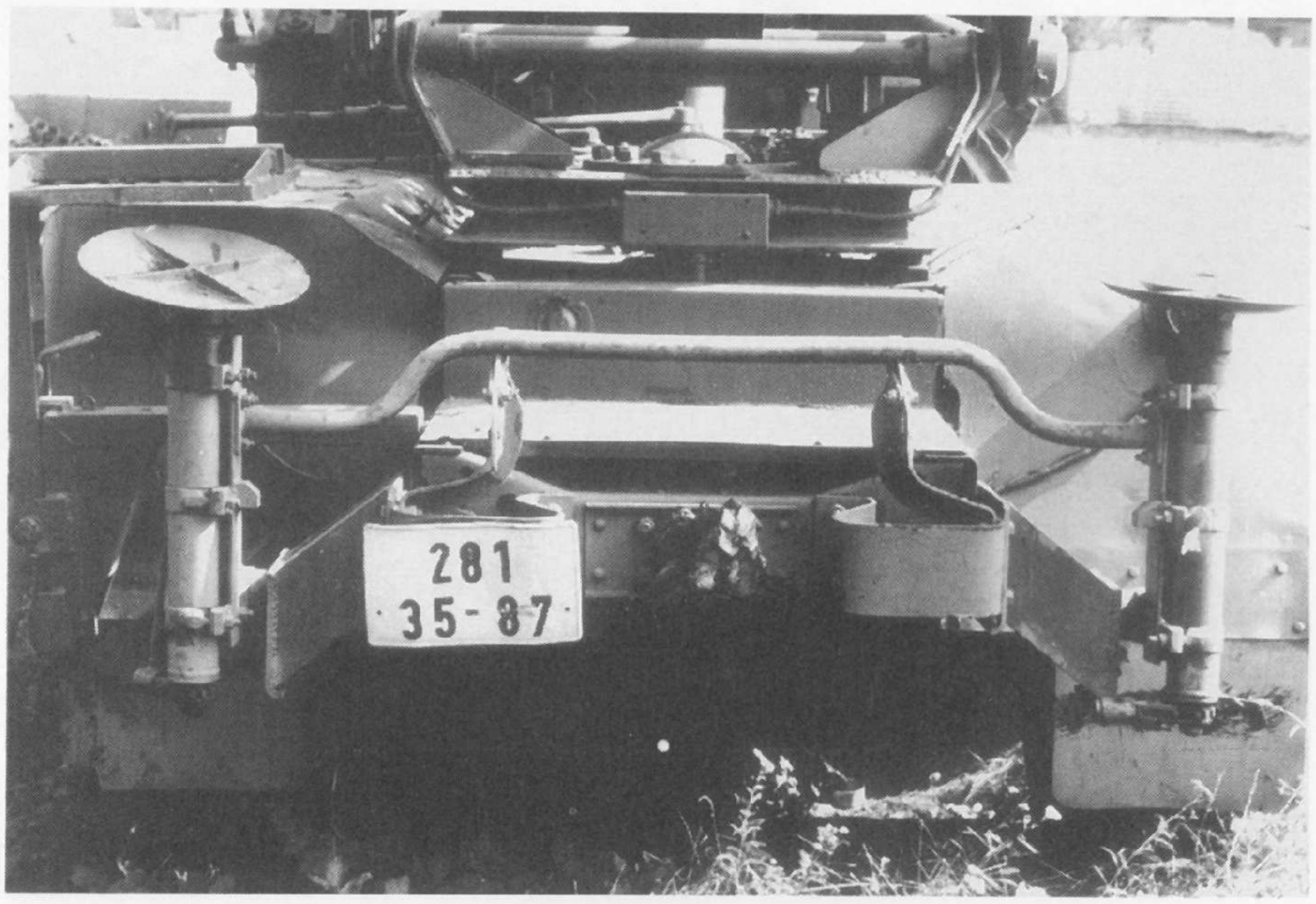
Left:
Front view of the same vehicle, with towing hook and winch.

Right:
The same vehicle from the rear. Note the locks at the ends of the launching rails.





Left:
Rear of the cab, with racks for spare wheels and seat for the crew.



Right:
The rear end, with jacks folded up.

Left and left center: BM-13-16 on ZIL-151 chassis (all-wheel drive). Right center: Guard launcher emblem on the door and wooden armor-plate rack on the roof. Lower left: Note the holes in the bumper for the crank (center) and tactical symbol attachment. Lower right: Crew seat behind the cab. On the door is the red star with yellow hammer and sickle.

A BM-13-16 on UralZIS chassis.

Below: A BM-13-16 on ZIL-151 chassis.

US Studebaker (BM-13-16) with license number UL-3450, on display at the Military Museum in Posen.

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ISBN: 0-88740-669-6